

CRPL-F 217 PART A

OCT 1 - 1962

FOR OFFICIAL USE

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taken from the library.

PART A

IONOSPHERIC DATA

ISSUED
SEPTEMBER 1962

U. S. DEPARTMENT OF COMMERCE
NATIONAL BUREAU OF STANDARDS
CENTRAL RADIO PROPAGATION LABORATORY
BOULDER, COLORADO

CRPL-F 217
PART A

NATIONAL BUREAU OF STANDARDS
CENTRAL RADIO PROPAGATION LABORATORY
BOULDER, COLORADO

Issued
24 Sept. 1962

IONOSPHERIC DATA

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IONOSPHERIC DATA

The CRPL-F series bulletins are issued as part of the responsibility of the Central Radio Propagation Laboratory for the exchange and dissemination of ionospheric and related geophysical data. While originally a by-product of the collection of data by the CRPL for use in radio propagation studies, the CRPL-F series bulletins, Part A, "Ionospheric Data," and Part B, "Solar-Geophysical Data," have provided useful service by collecting and making available a wide variety of data in convenient form for use in research, not only on radio propagation and the ionosphere, but also on a wide variety of geophysical problems. Beginning with CRPL-F 211, Part A, "Ionospheric Data," a number of changes have been made in the tables of ionospheric data which, by providing more information, should increase their usefulness.

The current form of the tables of ionospheric data provides the monthly medians and, in addition, the number of values entering into median determination (count) for all ionospheric characteristics listed. Also, the upper and lower quartile values, indicated by UQ and LQ in the tables, are listed for foF₂, h'F₂, h'F, and (M3000)F₂. Quartile values are not listed for the other characteristics because of space limitations. The tables are prepared by IBM machine methods, which, by improving the speed and efficiency of preparation, permit earlier publication of the data.

Graphs of critical frequencies and (M3000)F₂ will continue to appear. Graphs of percentage of time of occurrence for fEs and virtual heights of the regular ionospheric layers are no longer included. This change was necessary to provide space for the enlarged tables. Data on percentage of time of occurrence of fEs above 3, 5, and 7 Mc are still available from the CRPL and the IGY World Data Center A for Airglow and Ionosphere.

For many years, the tables of ionospheric data appearing in the F-series, Part A, listed values of medians recomputed at CRPL. While this practice enforced a certain uniformity, it was subject to some valid criticism for tampering with original data. The tables and graphs now show the ionospheric data just as they are provided by the originating laboratory. Responsibility for the accuracy and reliability of the data now rests entirely with the originator.

Gaps in the tables when data normally might be expected indicate the data were not provided by the originator. Following the recommendation of the World-Wide Soundings Committee, only values of median foEs are listed. In the few cases where fEs is still reported instead of foEs, the data will not be printed. Data will appear in the F-series, Part A, only when the complete daily-hourly tabulations have been received by the CRPL or the IGY World Data Center A for Airglow and Ionosphere.

Information on symbols, terminology, and conventions may be found in the "URSI Handbook of Ionogram Interpretation and Reduction, of the World-Wide Soundings Committee," edited by W. R. Piggott and K. Rawer (Elsevier, 1961), which supersedes previous documents. A list of symbols is available from CRPL on request.

The following table contains the latest available information on smoothed observed Zurich sunspot numbers, beginning with the minimum of April 1954. Final numbers are listed through June 1961, the succeeding values being based on provisional data.

Smoothed Observed Zurich Sunspot Number

Month	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1954				3	4	4	5	7	8	8	9	12
1955	14	16	19	23	29	35	40	46	55	64	73	81
1956	89	98	109	119	127	137	146	150	151	156	160	164
1957	170	172	174	181	186	188	191	194	197	200	201	200
1958	199	201	201	197	191	187	185	185	184	182	181	180
1959	179	177	174	169	165	161	156	151	146	141	137	132
1960	129	125	122	120	117	114	109	102	98	93	88	84
1961	80	75	69	64	60	56	53	52	52	51	50	48
1962	44	41										

Units of Ionospheric Data Tables

foF2, foEs - - - Tenth of a megacycle
 foF1, FOE - - - Hundredths of a megacycle
 h'F2, h'F, h'E - Kilometers
 (M3000)F2 - - - Hundredths

NOTE: Occasionally, when the median falls between two of the observed values, the median is carried an extra decimal place beyond these units. Those cases are easily identifiable by the extra digit appearing to the right of the number, in a column usually left blank.

MED - Median
 CNT - Count
 UQ - Upper Quartile
 LQ - Lower Quartile

WORLD - WIDE SOURCES OF IONOSPHERIC DATA

The ionospheric data given here in tables 1 to 100 and figures 1 to 100 were assembled by the Central Radio Propagation Laboratory for analysis and correlation, incidental to CRPL prediction of radio propagation conditions. The data are median values unless otherwise indicated. The following are the sources of the data in this issue:

Republica Argentina, Ministerio de Marina:

Deception I.

Trelew, Argentina

Tucuman, Argentina

Meteorological Service, Province of Macau, Asia:

Macau

Commonwealth of Australia, Department of the Interior:

Macquarie I.

Commonwealth of Australia, Ionospheric Prediction Service of the Commonwealth Observatory:

Mawson

Townsville, Australia

Australian Department of National Development, Bureau of Mineral Resources, Geology and Geophysics:

Mundaring, Western Australia

Universidad Mayor de San Andres:

La Paz, Bolivia

Electronics Directorate of the Brazilian Navy:

Natal, Brazil

British Department of Scientific and Industrial Research, Radio Research Board:

Halley Bay

Defence Research Board, Canada:

Eureka, Canada

Ottawa, Canada

Resolute Bay, Canada

St. John's, Newfoundland

Universidad de Concepcion:

Concepcion, Chile

Instituto Geofisico de Los Andes Colombianos:

Bogota, Colombia

Czechoslovak Academy of Sciences:
Pruhonice, Czechoslovakia

Danish National Committee of URSI:
Godhavn, Greenland

The Finnish Academy of Sciences and Letters:
Sodankyla, Finland

Ionospheric Research Group (GRI), France:
Kerguelen I.
Terre Adelie

Heinrich Hertz Institute, German Academy of Sciences, Berlin:
Juliusruh/Rugen, Germany

Indian Council of Scientific and Industrial Research, Radio Research
Committee, New Delhi, India:
Ahmedabad (Physical Research Laboratory)
Bombay (All India Radio)
Calcutta (Institute of Radio Physics and Electronics)
Delhi (All India Radio)
Kodaikanal (India Meteorological Department)
Madras (All India Radio)
Tiruchy (All India Radio)
Trivandrum (All India Radio)

Geophysical and Geodetic Institute, Genoa, Italy:
Genoa (Monte Capellino), Italy

National Institute of Geophysics, City University, Rome, Italy:
Rome, Italy

Christchurch Geophysical Observatory, New Zealand Department of Scientific
and Industrial Research:
Campbell I.

Norwegian Defence Research Establishment, Kjeller per Lillestrom, Norway:
Tromso, Norway

South African Council for Scientific and Industrial Research:
Salisbury, Southern Rhodesia (University College of Rhodesia and Nyasaland)

United States Army Signal Corps:
Ft. Monmouth, New Jersey

National Bureau of Standards (Central Radio Propagation Laboratory):
Anchorage, Alaska
Boulder, Colorado
Huancayo, Peru (Instituto Geofisico de Huancayo)
Maui, Hawaii
Talara, Peru (Instituto Geofisico de Huancayo)
Washington, D. C.

SPECIAL NOTICE

Termination of Hourly Electron Density Profile Tabulations

Hourly N(h) profiles for the Puerto Rico station have been published in the CRPL-F Reports, Part A, since May 1959, starting with the data for February 1959. This program terminated with the publication in CRPL-F215 of the data for March 1962. It is believed that this program has satisfied the objective of making available a large volume of profiles produced by methods of conventional accuracy. However, in anticipation of the increasing precision required by modern applications, we intend to concentrate further work on the calculation of more accurate profiles, inevitably in smaller volume.

TABLES OF IONOSPHERIC DATA

MONTEVIDEO 1961 - JANUARY 1958

1

P 1.0 MC TO 25.0 MC | N 13.5 SEC ON 5.

3

SWEETHEARTS IN 13.9 SECONDS.

4

OCTOBER • 1961

5

H0.9R		00		01		02		03		04		05		06		07		08		09		10		11		12		13		14		15		16		17		18		19		20		21		22		23					
MEO		6.6		6.2		5.65		5.5		4.85		4.45		3.7		5.0		6.3		7.0		7.3		7.75		8.05		8.1		8.7		9.25		9.0		9.7		10.2		10.7		11.2		11.7									
CNT		7.9		7.2		6.8		6.4		5.2		4.2		5.2		7.0		7.4		8.2		8.5		8.9		9.1		9.6		9.9		10.3		10.8		11.3		11.7															
U		5.8		5.4		5.0		4.4		4.2		3.0		2.7		6.0		6.6		6.8		7.2		7.7		8.1		8.5		8.8		9.1		9.3		9.6		9.9															
L0		5.0		4.4		4.2		3.0		2.7		4.7		6.0		6.6		6.8		6.8		7.2		7.7		8.1		8.5		8.8		9.1		9.4		9.7																	
MEO		6.6		6.2		5.65		5.5		4.85		4.45		3.7		5.0		6.3		7.0		7.3		7.75		8.05		8.1		8.7		9.25		9.0		9.7		10.2		10.7		11.2		11.7									
CNT		7.9		7.2		6.8		6.4		5.2		4.2		5.2		7.0		7.4		8.2		8.5		8.9		9.1		9.6		9.9		10.3		10.8		11.3		11.7															
U		5.8		5.4		5.0		4.4		4.2		3.0		2.7		6.0		6.6		6.8		7.2		7.7		8.1		8.5		8.8		9.1		9.4		9.7		10.0		10.3		10.7		11.0									
L0		5.0		4.4		4.2		3.0		2.7		4.7		6.0		6.6		6.8		6.8		7.2		7.7		8.1		8.5		8.8		9.1		9.4		9.7		10.0		10.3		10.7		11.0									
MEO		2.5		2.0		1.5		2.5		2.0		2.5		2.75		2.10		2.00		2.25		2.00		2.05		2.0		2.20		2.50		2.0		2.30		2.50		2.80		3.10		3.50		3.80		4.10		4.40		4.70		5.00	
CNT		2.5		2.0		1.5		2.5		2.0		2.5		2.75		2.10		2.00		2.25		2.00		2.05		2.0		2.20		2.50		2.0		2.30		2.50		2.80		3.10		3.50		3.80		4.10		4.40		4.70		5.00	
U		2.5		2.0		1.5		2.5		2.0		2.5		2.75		2.10		2.00		2.25		2.00		2.05		2.0		2.20		2.50		2.0		2.30		2.50		2.80		3.10		3.50		3.80		4.10		4.40		4.70		5.00	
L0		2.5		2.0		1.5		2.5		2.0		2.5		2.75		2.10		2.00		2.25		2.00		2.05		2.0		2.20		2.50		2.0		2.30		2.50		2.80		3.10		3.50		3.80		4.10		4.40		4.70		5.00	
MEO		2.5		2.0		1.5		2.5		2.0		2.5		2.75		2.10		2.00		2.25		2.00		2.05		2.0		2.20		2.50		2.0		2.30		2.50		2.80		3.10		3.50		3.80		4.10		4.40		4.70		5.00	
CNT		2.5		2.0		1.5		2.5		2.0		2.5		2.75		2.10		2.00		2.25		2.00		2.05		2.0		2.20		2.50		2.0		2.30		2.50		2.80		3.10		3.50		3.80		4.10		4.40		4.70		5.00	
U		2.5		2.0		1.5		2.5		2.0		2.5		2.75		2.10		2.00		2.25		2.00		2.05		2.0		2.20		2.50		2.0		2.30		2.50		2.80		3.10		3.50		3.80		4.10		4.40		4.70		5.00	
L0		2.5		2.0		1.5		2.5		2.0		2.5		2.75		2.10		2.00		2.25		2.00		2.05		2.0		2.20		2.50		2.0		2.30		2.50		2.80		3.10		3.50		3.80		4.10		4.40		4.70		5.00	
MEO		2.5		2.0		1.5		2.5		2.0		2.5		2.75		2.10		2.00		2.25		2.00		2.05		2.0		2.20		2.50		2.0		2.30		2.50		2.80		3.10		3.50		3.80		4.10		4.40		4.70		5.00	
CNT		2.5		2.0		1.5		2.5		2.0		2.5		2.75		2.10		2.00																																			

TABLE I

TABLE I

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TABLE 13

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TABLE

TIME 150000																									
MAUI* HAWAII 120-8N. 156-5W		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
16 F2	MED	465	455	34	32	26	25	26	75	89	101	112	125	131	133	138	134	126	108	76	61	58	52	50	
	CNT	142	140	31	28	26	25	26	60	71	81	91	101	111	114	116	113	104	86	30	31	30	29	28	
	LQ	137	139	33	27	22	22	23	50	72	74	81	107	115	123	129	120	113	90	64	59	45	43	41	
17 F2	MED	2475	2475	2475	2475	2475	2475	2475	270	300	2975	310	3055	3055	3055	265	270	250	250	250	235	235	235	235	235
	CNT	250	250	250	250	250	250	250	270	275	275	285	310	310	310	310	300	300	300	300	300	295	295	295	295
	LQ	250	250	250	250	250	250	250	270	275	275	285	310	310	310	310	300	300	300	300	300	295	295	295	295
18 F	MED	235	235	234	220	205	195	185	230	220	210	205	200	195	205	215	215	230	230	230	215	215	215	215	215
	CNT	311	311	311	280	280	280	280	311	310	310	310	310	310	310	310	310	300	300	300	300	300	300	300	300
	LQ	260	260	260	250	250	250	250	270	270	270	270	270	270	270	270	270	250	250	250	250	250	250	250	250
19 F	MED	3175	3175	3175	3175	3175	3175	3175	3205	3325	3300	3200	3100	2900	2750	2500	2350	2150	2150	2150	2150	2150	2150	2150	2150
	CNT	300	300	300	300	300	300	300	305	305	305	305	305	305	305	305	305	300	300	300	300	300	300	300	300
	LQ	305	320	325	320	320	320	320	320	320	320	320	320	320	320	320	320	300	300	300	300	300	300	300	300
20 F	MED	2475	2475	2475	2475	2475	2475	2475	270	300	2975	310	3055	3055	3055	265	270	250	250	250	245	245	245	245	245
	CNT	250	250	250	250	250	250	250	270	275	275	285	310	310	310	310	300	300	300	300	300	295	295	295	295
	LQ	250	250	250	250	250	250	250	270	275	275	285	310	310	310	310	300	300	300	300	300	295	295	295	295
21 F	MED	2475	2475	2475	2475	2475	2475	2475	270	300	2975	310	3055	3055	3055	265	270	250	250	250	245	245	245	245	245
	CNT	250	250	250	250	250	250	250	270	275	275	285	310	310	310	310	300	300	300	300	300	295	295	295	295
	LQ	250	250	250	250	250	250	250	270	275	275	285	310	310	310	310	300	300	300	300	300	295	295	295	295
22 F	MED	2475	2475	2475	2475	2475	2475	2475	270	300	2975	310	3055	3055	3055	265	270	250	250	250	245	245	245	245	245
	CNT	250	250	250	250	250	250	250	270	275	275	285	310	310	310	310	300	300	300	300	300	295	295	295	295
	LQ	250	250	250	250	250	250	250	270	275	275	285	310	310	310	310	300	300	300	300	300	295	295	295	295
23 F	MED	2475	2475	2475	2475	2475	2475	2475	270	300	2975	310	3055	3055	3055	265	270	250	250	250	245	245	245	245	245
	CNT	250	250	250	250	250	250	250	270	275	275	285	310	310	310	310	300	300	300	300	300	295	295	295	295
	LQ	250	250	250	250	250	250	250	270	275	275	285	310	310	310	310	300	300	300	300	300	295	295	295	295

31 31 31 31 31 31 30

TABLE 22

1.6 MC TO 20.0 MC IN 18 SECONDS.

2

JANUARY, 1961

6

JANUARY 1961

10

L, BOLIVIA (16.5S. 68.1W)

TIME 60.00M

	TIME: 75.0W		
	20	21	22
U ₂₀	260	260	257.5
U ₂₁	262	271	278
U ₂₂	265	272	280
U ₂₃	260	270	275
U ₂₄	240	240	240
U ₂₅	280	285	297.5
U ₂₆	285	290	300
U ₂₇	270	275	280

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48(2)

TABLE 26

15

TAGI 6 39

SWEET 1.0 MC TO 25.0 MC IN 13.5 SECONDS.

JUNE • 1960

May • 1990

SWEET 1.0 MC TO 25.0 MC IN 35 SECONDS

•BLUE 29

WEED 1.0 MC TO 25.0 MC IN 30 SECONDS.

11.0 MC TO 25.0 MC IN 35 SECONDS.

ARCH. 196

31

TABLE 32

SEPTEMBER 1930 VOL 3 NO 9 SECTIONS

SLEEP 1-0 MC TO 25-0 MC IN 30 SECONDS

1984

3

TABLE 34

NOVEMBER 1954

OPERATION •

• 11 •

TABLE 38

TABLE 39

TABLE I

OCTOBER 1960

TABLE 42

RÜME • ITALY 141°N, 12°E

OPERATION AUTOMATIC

10

TABLE I

1

1

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11

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	
HOUR	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	
MED	1.14	1.00	0.92	0.85	0.66	0.65	1.04	1.18	1.22	1.18	1.15	1.17	1.20	1.18	1.26	1.31	1.22	1.15	1.21	1.21	1	1	3	
CNT	1.5	1.5	1.5	3	1.0	1.3	2.2	2.9	3.1	3.0	3.0	2.9	2.6	2.9	2.8	1.3	1.3	1.3	1.3	1.3	1.3	1	1	3
LO	LO	LO	LO																					
</td																								

SWEET 1.5 MC TO 18.0 MC IN 5 MINUTES; MANUAL OPERATION.

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1

AUGUST 196

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יולי • 1959

NATE 1959

TIME 120.05
DOARING, W. AUSTRALIA (32.05° S 116.2° E)

M3000/F2
G17
G18
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G98
G99
G100

104

Ergonomics

TABLE 66

TIAA-CREF

TABLE C-8

Time													
10	11	12	13	14	15	16	17	18	19	20	21	22	23
88	85	90	90	88	88	84	80	72	72	63	59	60	58
46	49	50	50	48	48	46	42	36	36	30	26	26	24
71	65	71	71	72	72	68	68	63	63	54	54	54	54
54	50	50	50	50	50	48	48	44	44	40	36	36	34
54	50	50	50	50	50	48	48	44	44	40	36	36	34
46	43	47	45	44	44	40	40	35	35	30	26	26	24
46	43	47	45	44	44	40	40	35	35	30	26	26	24
46	43	47	45	44	44	40	40	35	35	30	26	26	24
46	43	47	45	44	44	40	40	35	35	30	26	26	24
46	43	47	45	44	44	40	40	35	35	30	26	26	24

240

505 506

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TABLE III

TABLE 6

EEB 101 MC TO 200 MC IN 16 SEC QM

JANUARY • 1959

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JANUARY • 195

JANUARY • 195

73

TABLE 73
PERCENTION 1, 163.05, 60.1W

75

TIME 1350
TERRRE AOLEIE 166.75° 140.0E

TABLE 76

SWEET 1-2 MC TO 17-0 MC IN 1 MINUTE

DECEMBER, 1958

LEP 1.3 MC TO 18.0 MC IN 30 SECONDS.

200

TERRE ADELIE (66°57'S - 140°40'E)		TIME 1350E																							
HOUR	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
16F2	MED	57	52	55	58	57	59	U ₃	42	70	U ₄	72	74	70	76	80	76	78	77	75	74	70	66	60	
CNT	L0	16	18	15	14	17	15	21	18	17	15	17	21	17	22	23	24	23	26	21	22	13	14	19	20
16F2	MED	4048	500	450	500	492	455	472	455	480	475	450	455	445	435	425	400	395	385	375	365	355	345	335	320
CNT	L0	6	11	19	19	18	17	22	23	20	20	27	27	23	22	11	6								
16F2	MED	305	300	298	210	280	250	255	210	332	215	220	200	200	220	245	200	215	245	200	245	200	215	220	230
CNT	L0	26	24	24	25	28	27	23	21	16	13	14	18	23	20	23	25	20	23	27	20	28	20	28	28
16F2	MED	212	255	260	268	258	250	245	235	448	245	233	230	235	232	235	238	245	245	250	250	255	260	260	250
CNT	L0	10	14	9	10	8	7	11	5	10	12	13	14	11	12	14	16	19	21	17	18	11	6	11	13
M3000 F2	MED	320	400	430	480	500	500	500	510	510	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
CNT	L0	1	9	13	20	25	21	21	21	21	23	24	24	24	24	24	24	24	24	24	24	24	24	24	24
16F2	MED	E	E	155	230	250	180	300	325	300	352	325	370	310	355	362	320	325	327	248	210	155	E	E	E
CNT	L0	16	10	24	24	20	18	11	12	8	16	15	16	15	16	15	20	23	20	24	20	17	17	17	16
16F2	MED	E	E	E	120	115	110	105	105	105	100	100	100	100	100	100	105	105	105	105	105	105	105	105	105
CNT	L0	48	49	12	9	16	12	9	16	20	25	27	29	28	27	25	22	19	17	14	9	13	17	17	17
16F2	MED	28	31	28	30	29	30	30	26	29	29	29	29	29	29	29	30	29	30	29	30	29	30	29	30
CNT	L0	30	30	28	30	29	30	30	26	29	29	29	29	29	29	29	30	29	30	29	30	29	30	29	30

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NOVEMBER • 1958

TABLE 81

TABLE 82

OCTOBER 1958

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MEGAP 1.0 MC TO 13.0 MC IN 1 MINUTE 55 SECONDS.

TIME 75.0E

TIME 75.0E

REVIEW OF BOOKS 173

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TABLE 91

TABLE 9C

TABLE V

AUGUST. 1958

SWEETPEA 1.0 MC TO 15.0 MC IN 5 MINUTES. MANUAL OPERATIONS.

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TABLE 9

SWEET 1.0 MC TO 25.0 MC IN 25 SECONDS

FEBRUARY • 1958

156

一九四九年五月

GRAPHS OF IONOSPHERIC DATA

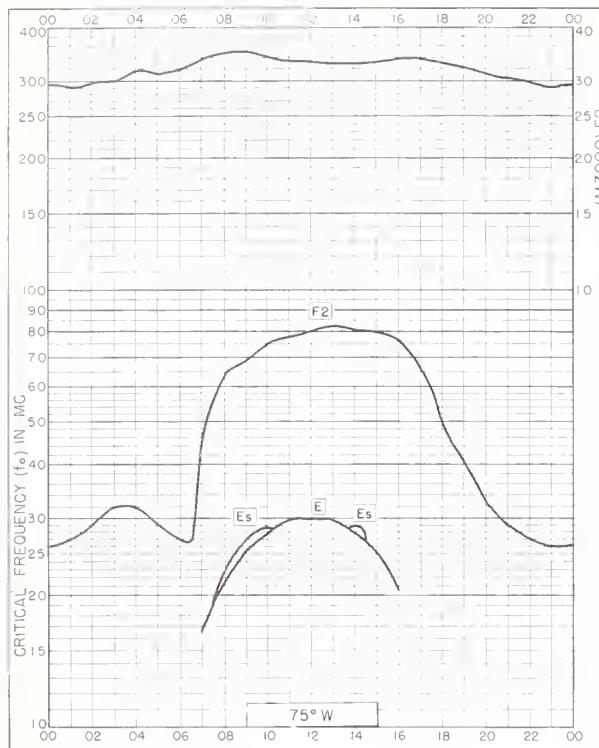


Fig. 1. WASHINGTON, D.C.
38.7°N, 77.1°W NOVEMBER 1961

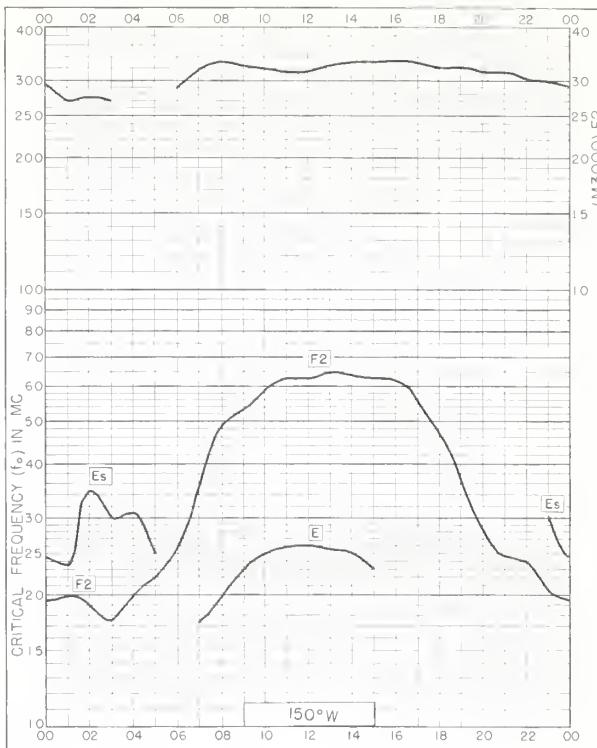


Fig. 2. ANCHORAGE, ALASKA
61.2°N, 149.9°W OCTOBER 1961

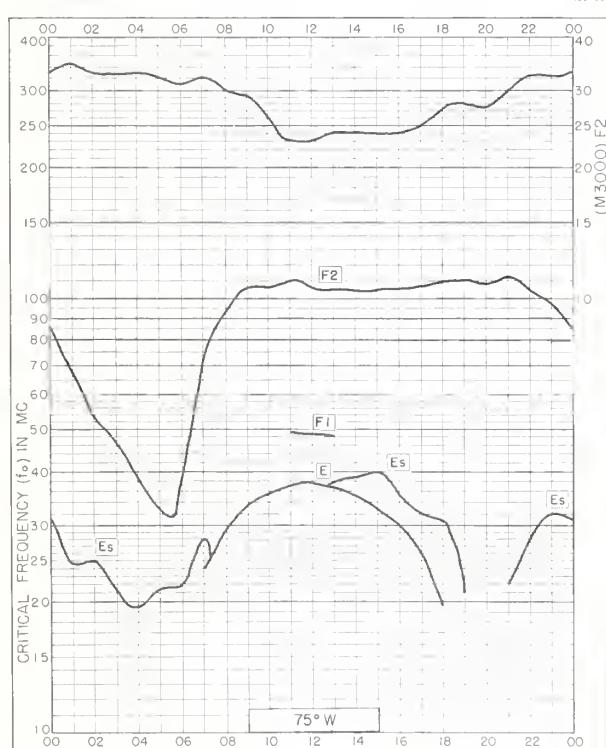


Fig. 3. TALARA, PERU
4.6°S, 81.3°W OCTOBER 1961

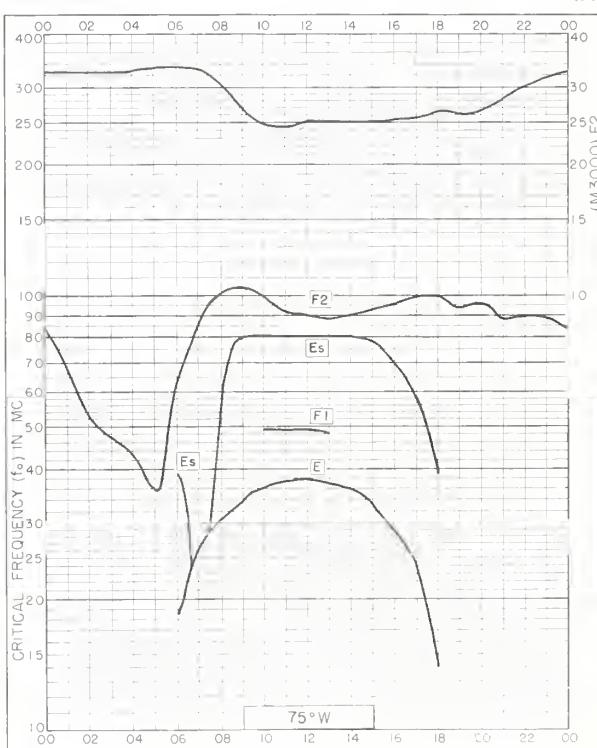


Fig. 4. HUANCAYO, PERU
12.0°S, 75.3°W OCTOBER 1961

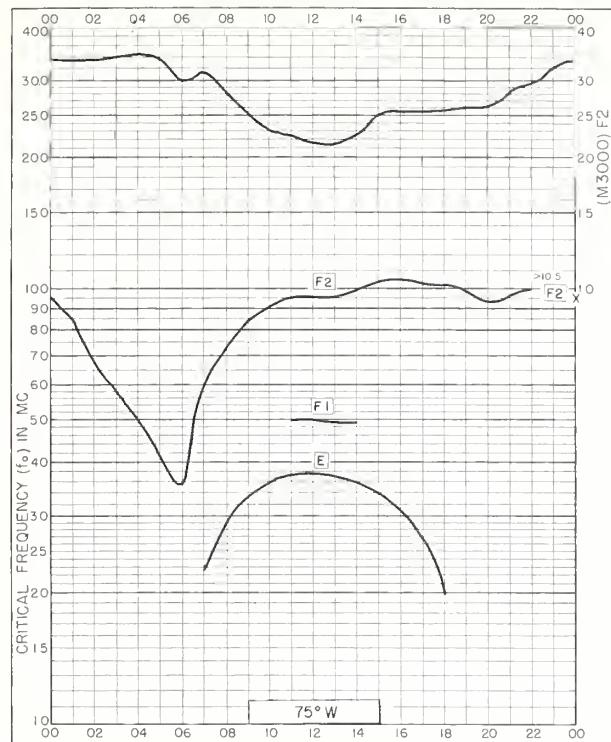


Fig. 5. TALARA, PERU
4.6°S, 81.3°W SEPTEMBER 1961

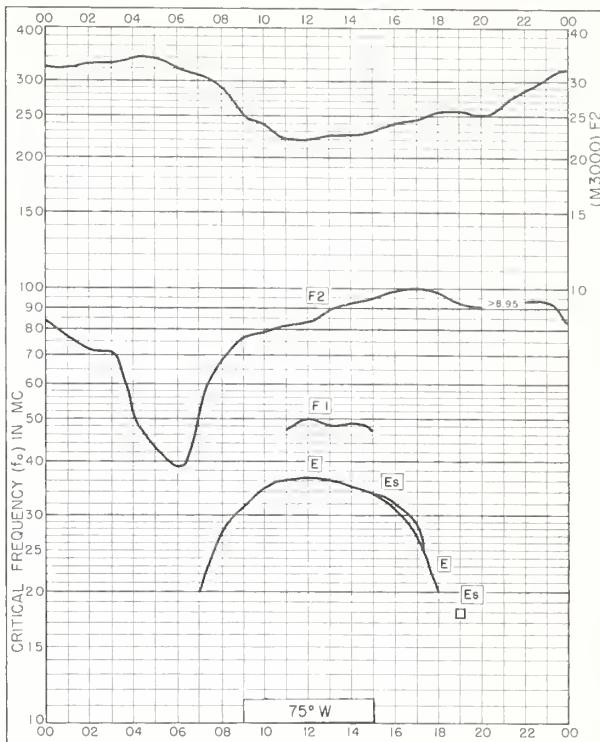


Fig. 6. TALARA, PERU
4.6°S, 81.3°W AUGUST 1961

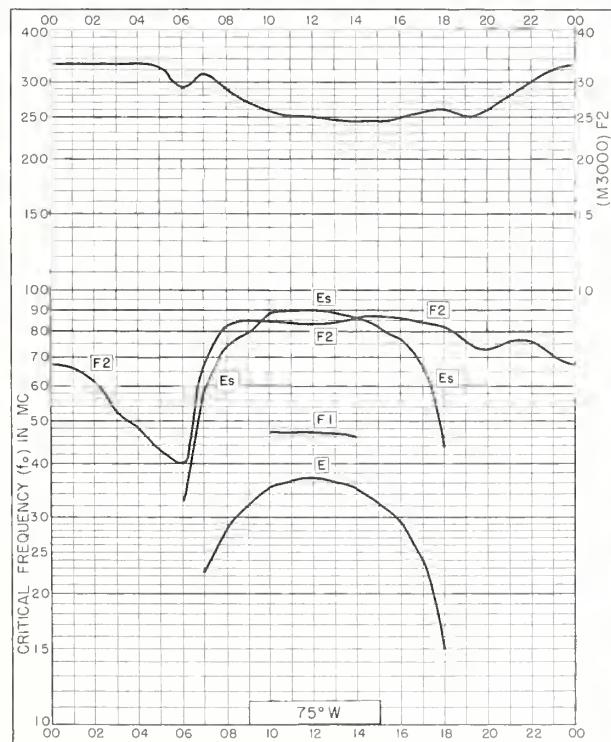


Fig. 7. HUANCAYO, PERU
12.0°S, 75.3°W AUGUST 1961

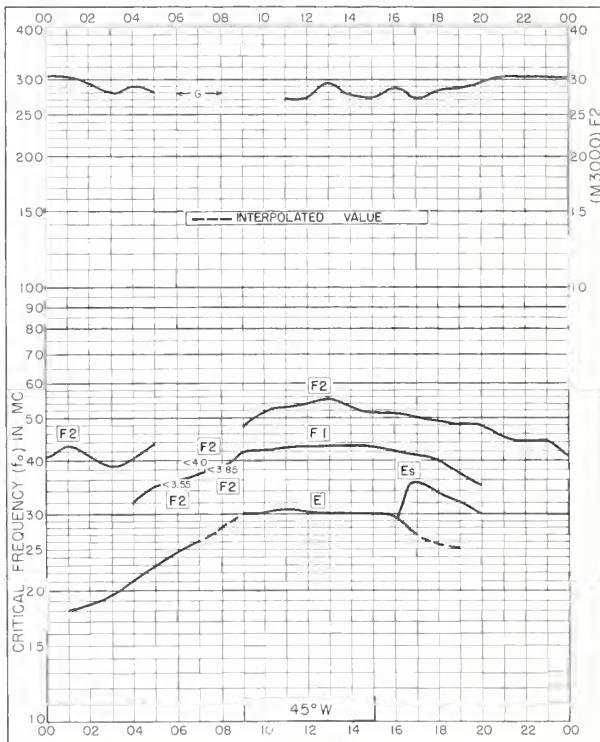


Fig. 8. GODHAVN, GREENLAND
69.3°N, 53.5°W JULY 1961

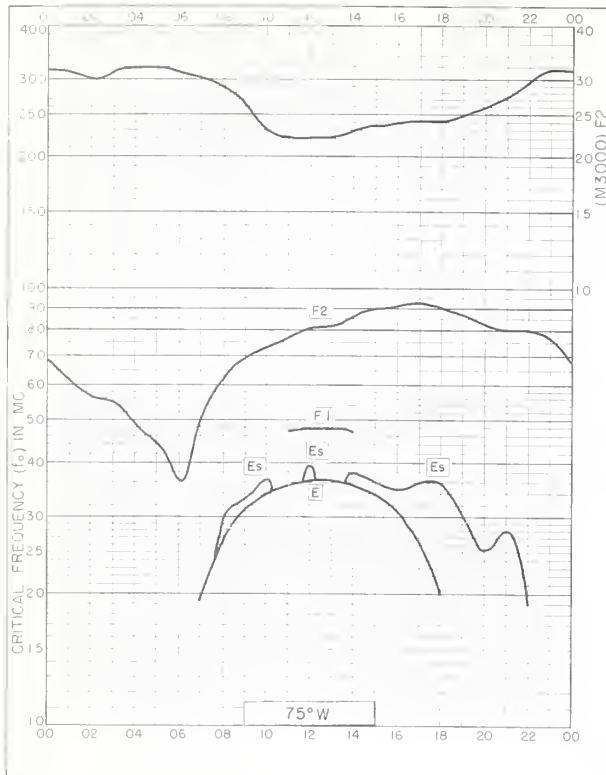


Fig 9. TALARA, PERU
46°S, 81.3°W JULY 1961

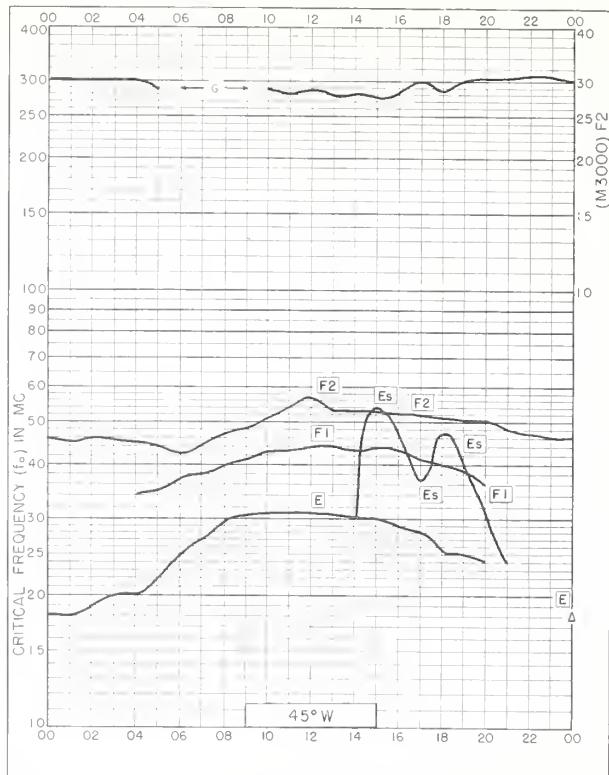


Fig 10. GODHAVN, GREENLAND
69.3°N, 53.5°W JUNE 1961

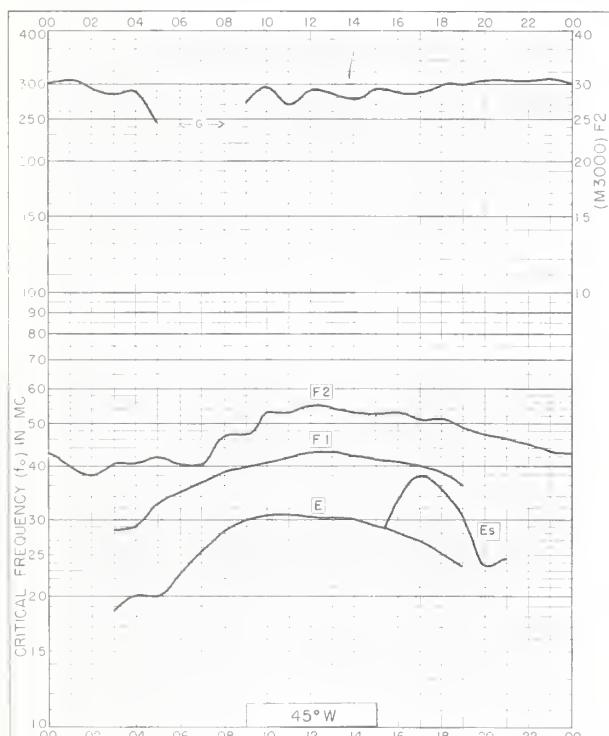


Fig 11. GODHAVN, GREENLAND
69.3°N, 53.5°W MAY 1961

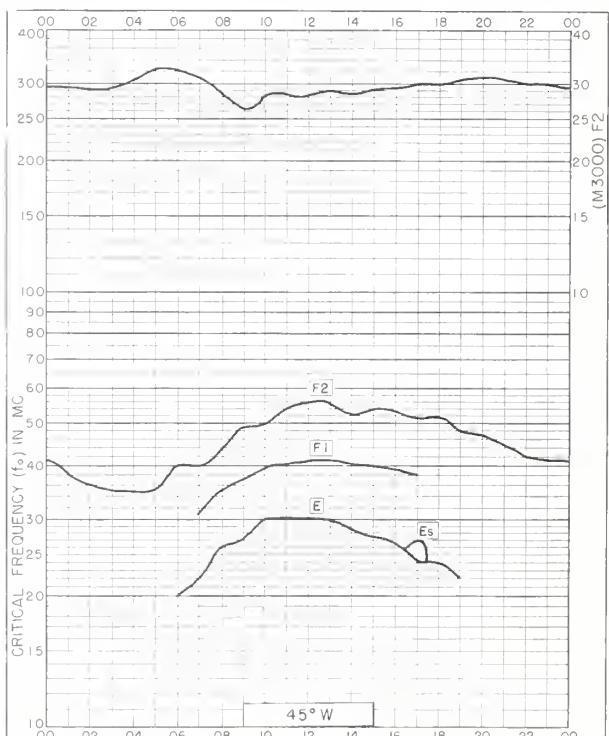


Fig 12. GODHAVN, GREENLAND
69.3°N, 53.5°W APRIL 1961

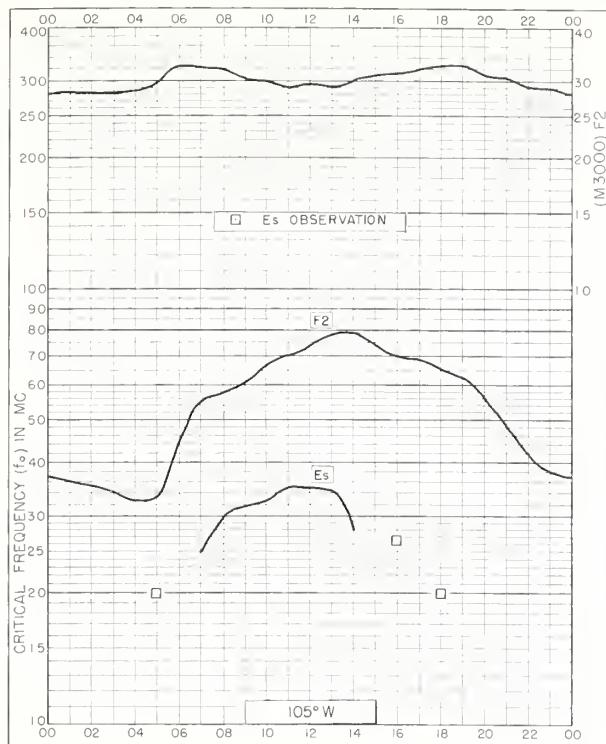


Fig. 13. BOULDER, COLORADO
40°N, 105.3°W APRIL 1961

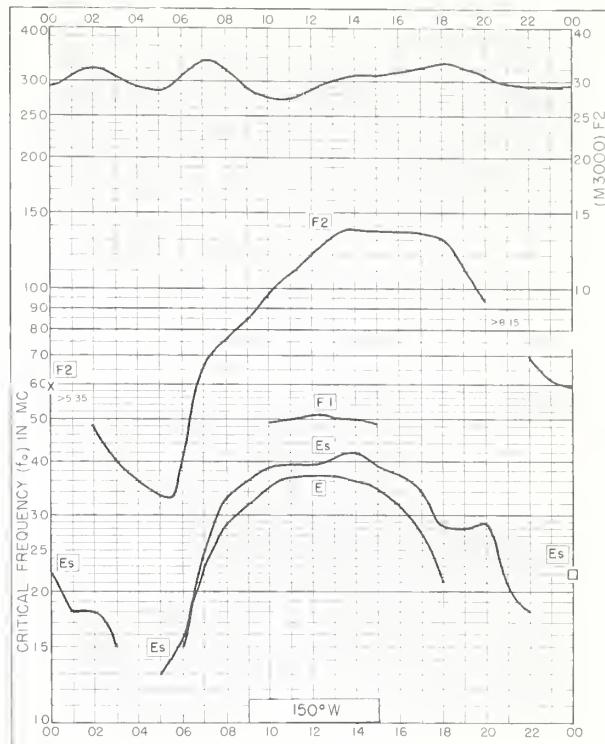


Fig. 14. MAUI, HAWAII
20.8°N, 156.5°W APRIL 1961

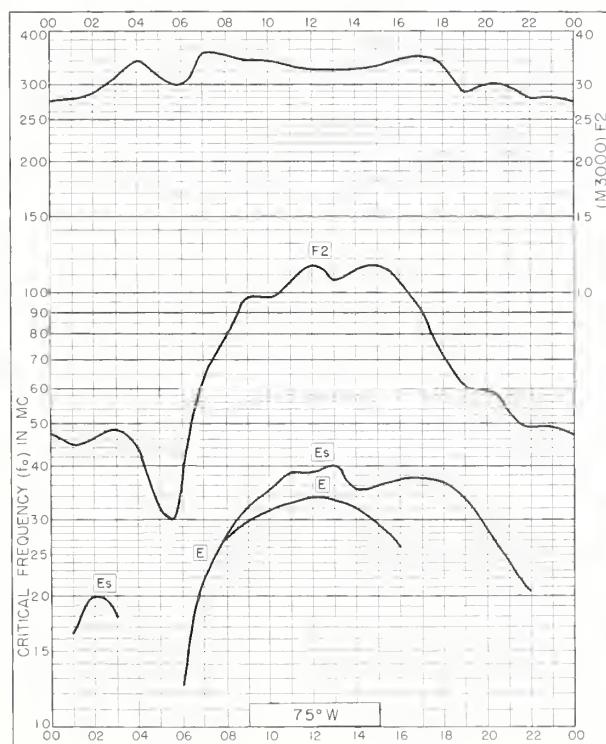


Fig. 15. CONCEPCION, CHILE
36.6°S, 73.0°W APRIL 1961

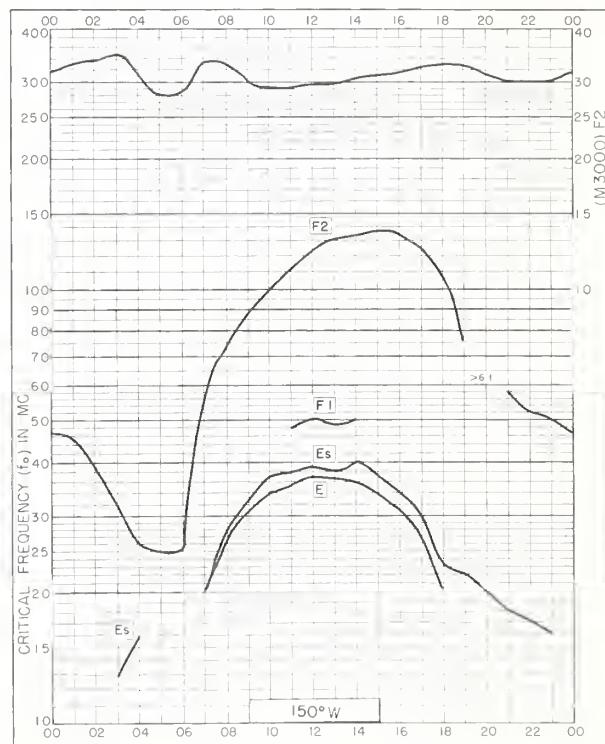


Fig. 16. MAUI, HAWAII
20.8°N, 156.5°W MARCH 1961

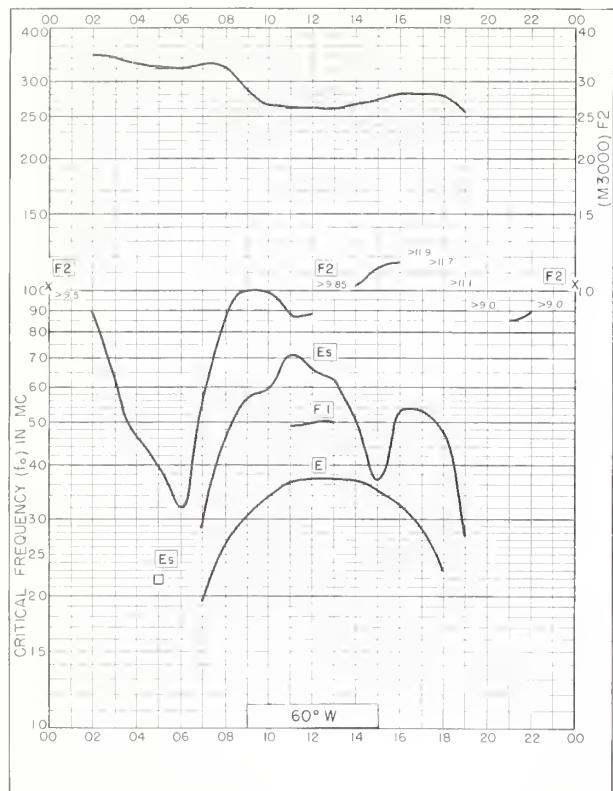


Fig. 17 La PAZ, BOLIVIA
16.5°S, 68.1°W MARCH 1961

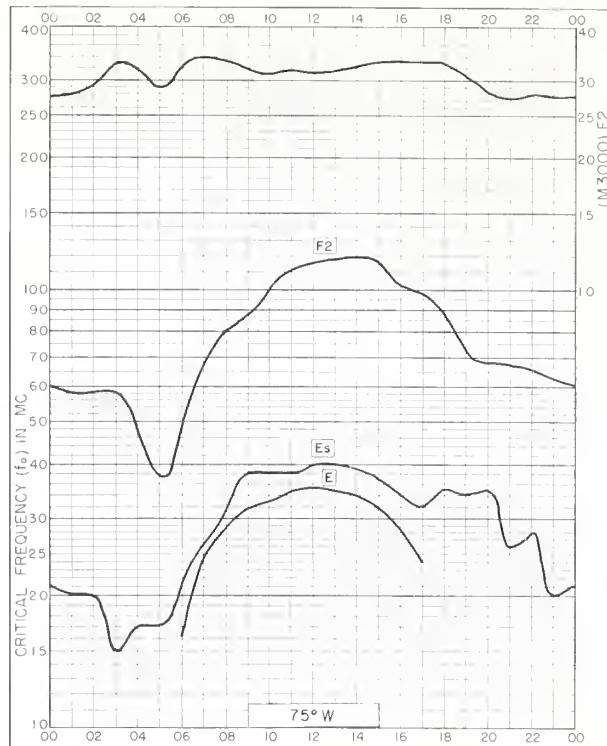


Fig. 18 CONCEPCION, CHILE
36.6°S, 73.0°W MARCH 1961

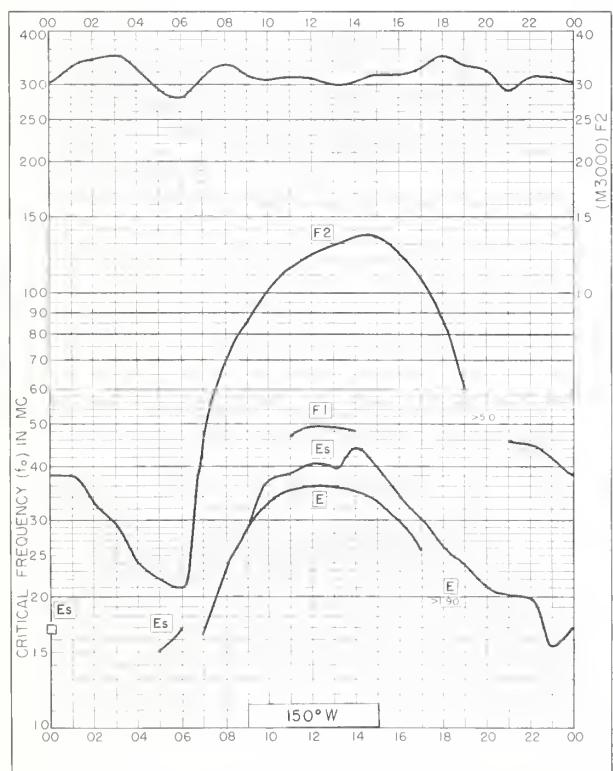


Fig. 19. MAUI, HAWAII
20.8°N, 156.5°W FEBRUARY 1961

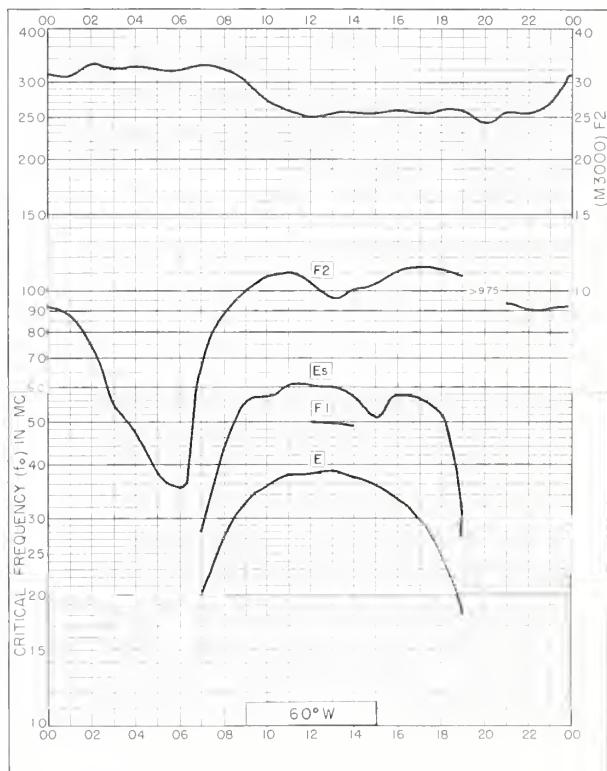


Fig. 20. La PAZ, BOLIVIA
16.5°S, 68.1°W FEBRUARY 1961

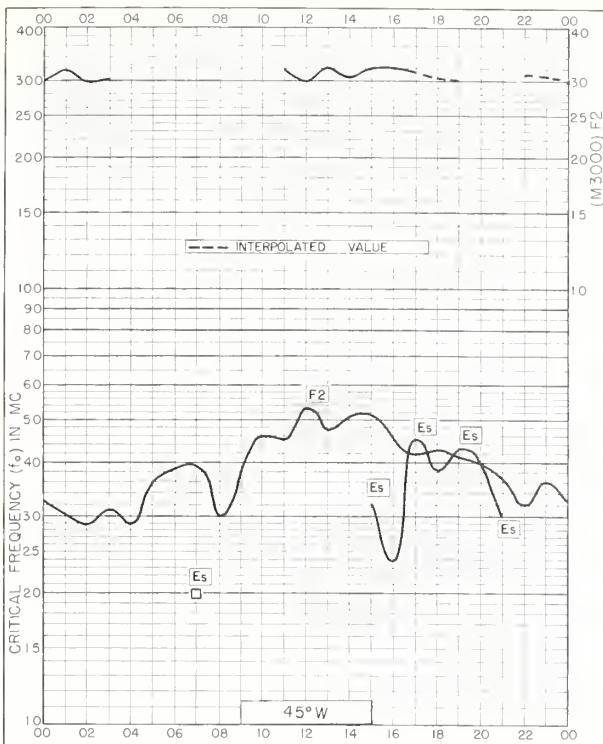


Fig. 21. GODHAVN, GREENLAND
69.3°N, 53.5°W JANUARY 1961



Fig. 22. MAUI, HAWAII
20.8°N, 156.5°W JANUARY 1961

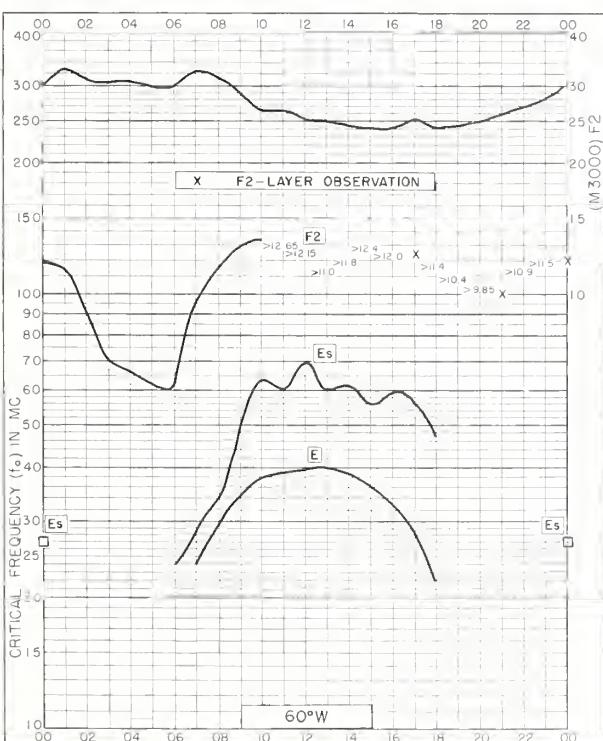


Fig. 23. LA PAZ, BOLIVIA
16.5°S, 68.1°W OCTOBER 1960

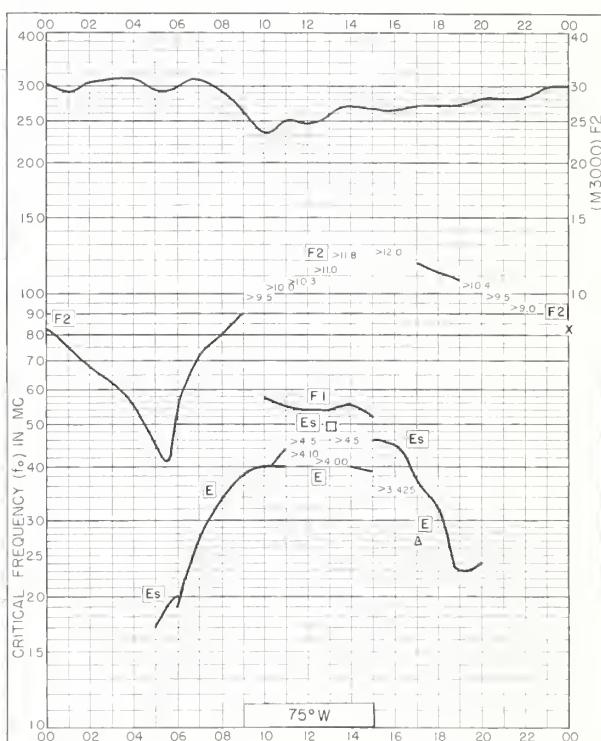


Fig. 24. BOGOTA, COLOMBIA
4.5°N, 74.2°W AUGUST 1960

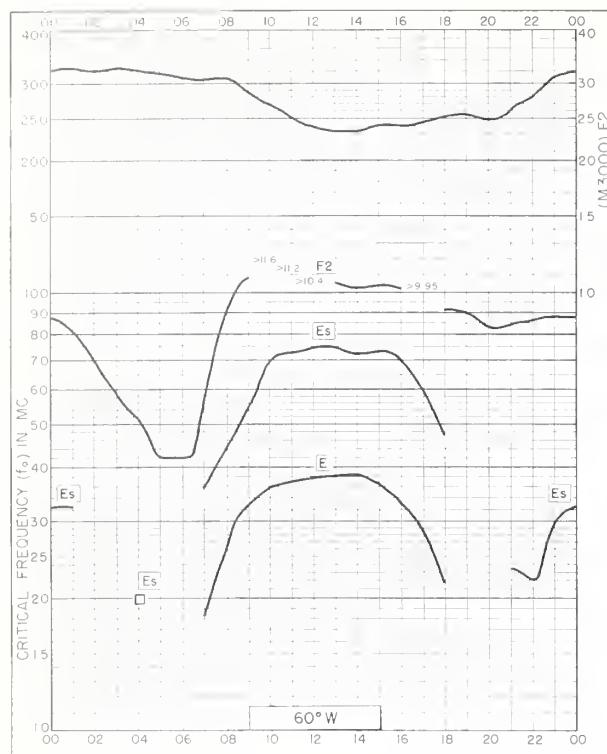


Fig. 25. LA PAZ, BOLIVIA
16.5°S, 68.1°W AUGUST 1960



Fig. 26. FT. MONMOUTH, NEW JERSEY
40.4°N, 74.1°W JUNE 1960

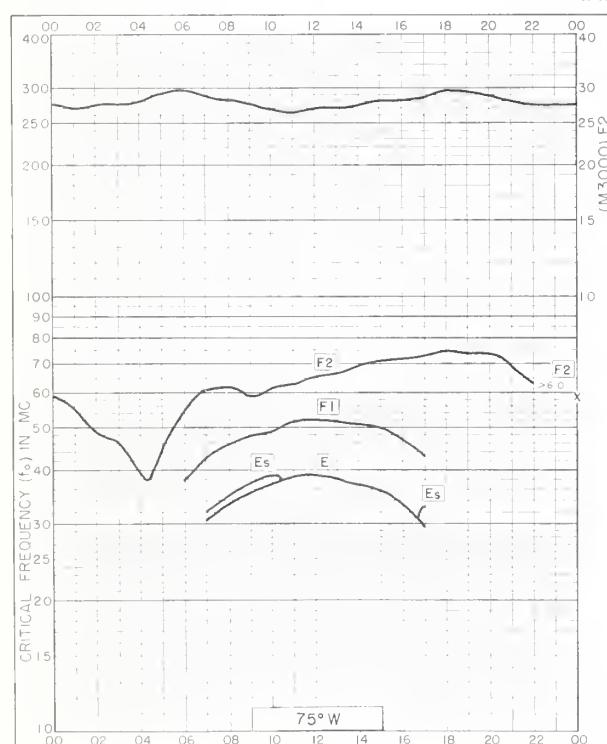


Fig. 27. FT. MONMOUTH, NEW JERSEY
40.4°N, 74.1°W MAY 1960

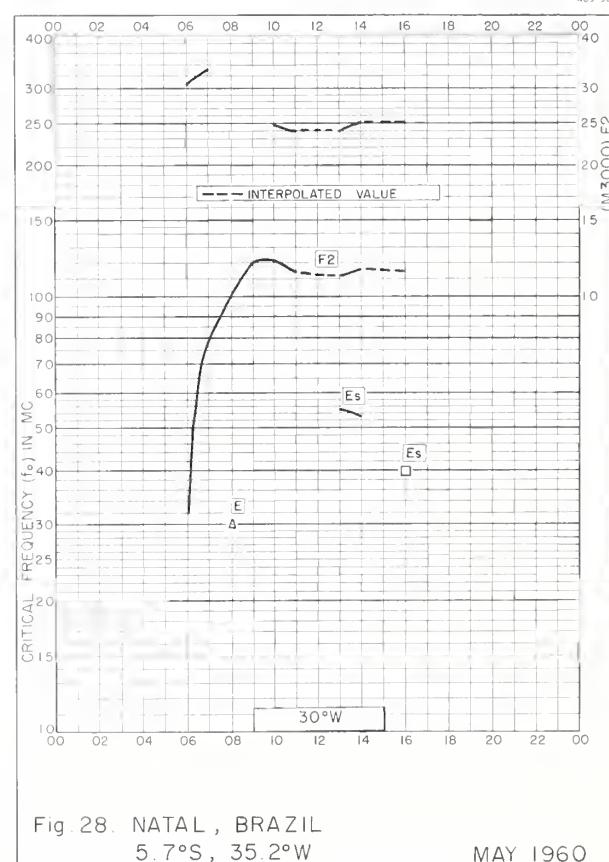


Fig. 28. NATAL, BRAZIL
5.7°S, 35.2°W MAY 1960

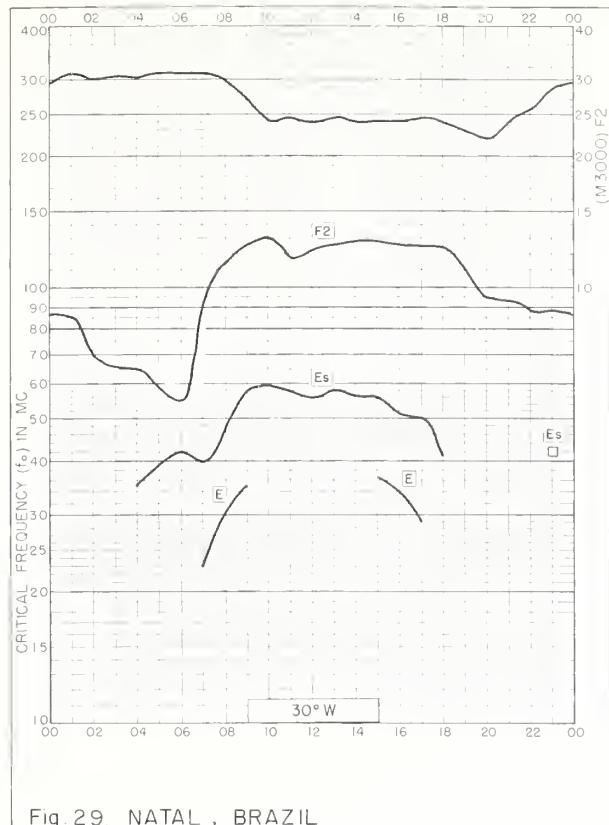


Fig. 29. NATAL, BRAZIL
5.7°S, 35.2°W APRIL 1960

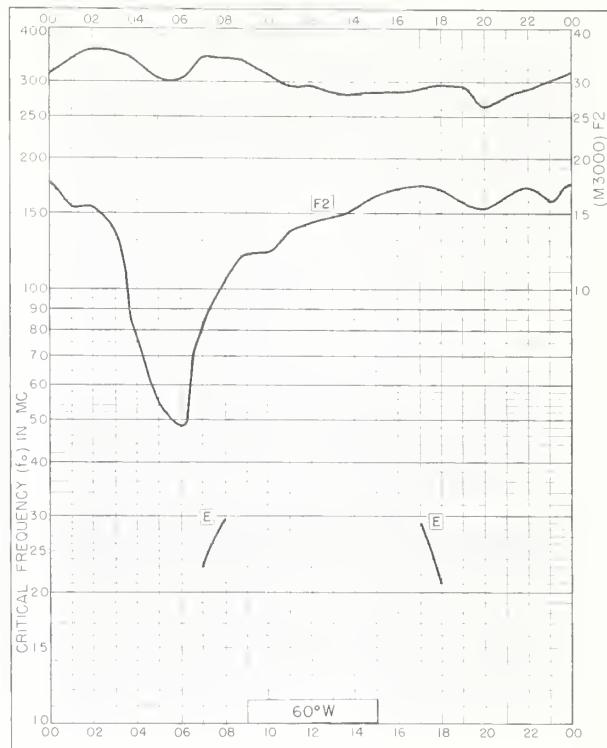


Fig. 30. TUCUMAN, ARGENTINA
26.9°S, 65.4°W MARCH 1960

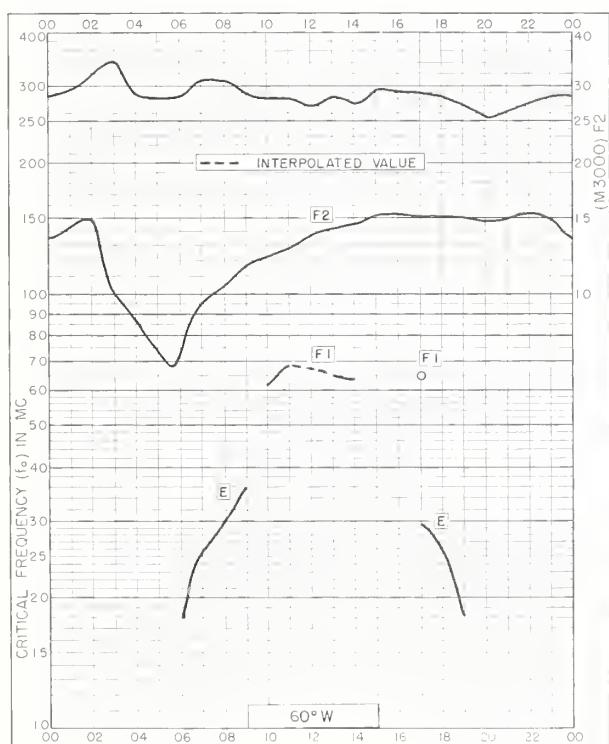


Fig. 31. TUCUMAN, ARGENTINA
26.9°S, 65.4°W FEBRUARY 1960

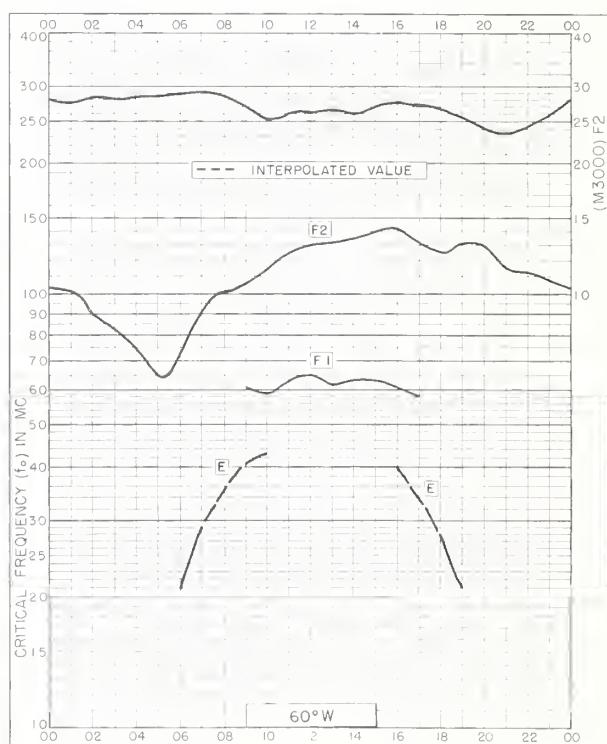


Fig. 32. TUCUMAN, ARGENTINA
26.9°S, 65.4°W JANUARY 1960

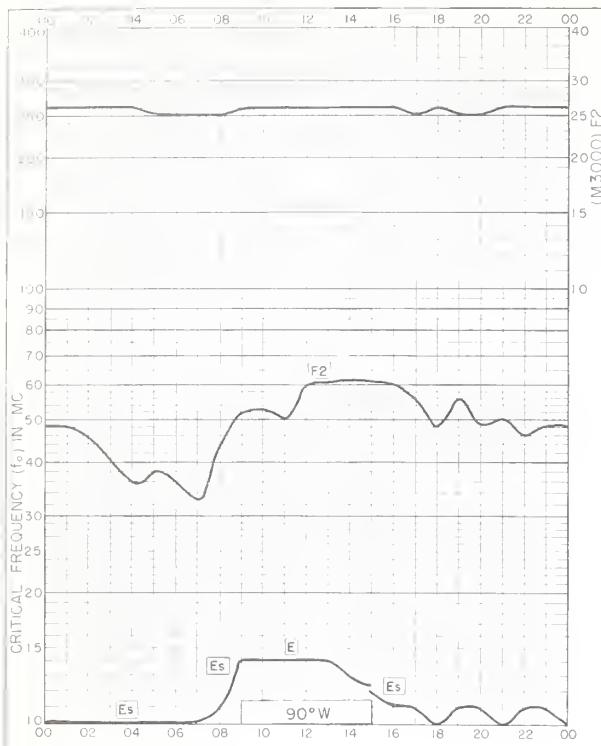


Fig. 33. RESOLUTE BAY, CANADA
74.7°N, 94.9°W NOVEMBER 1959



Fig. 34. GENOA(MONTE CAPELLINO), ITALY
44.6°N, 9.0°E NOVEMBER 1959

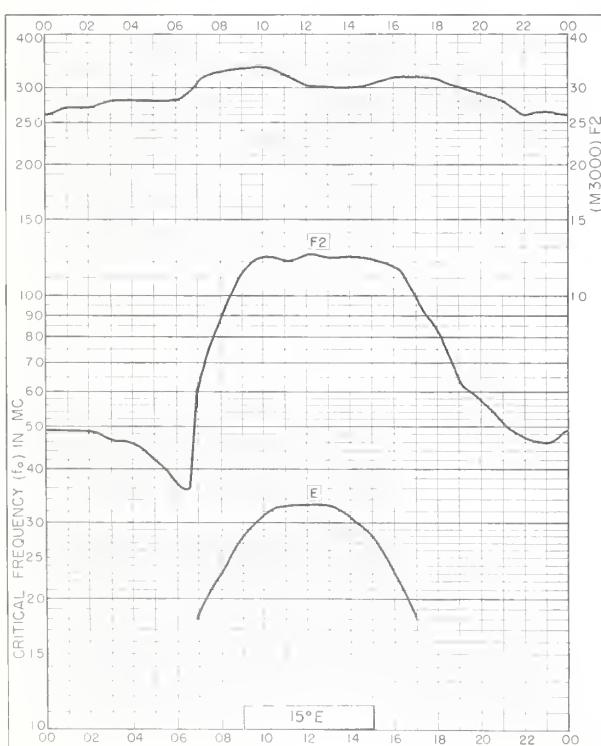


Fig. 35. ROME , ITALY
41.8°N, 12.5°E NOVEMBER 1959

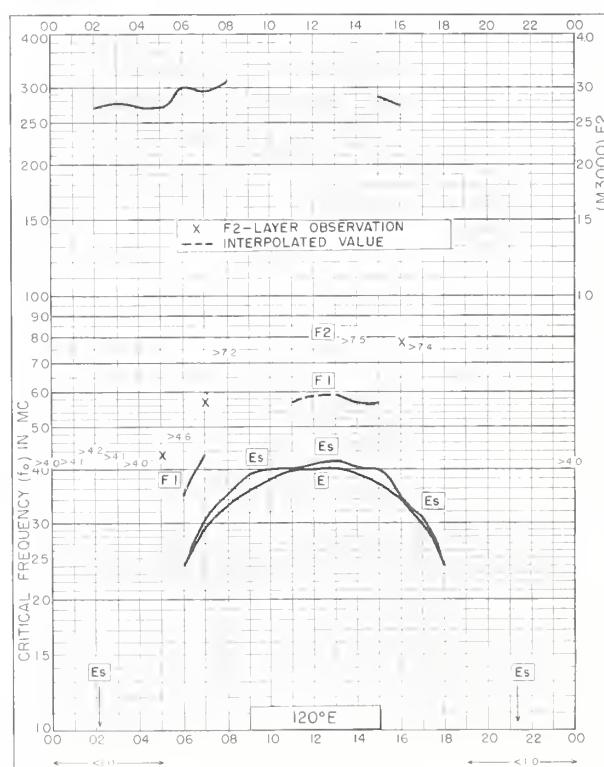


Fig. 36. MUNDARING , W. AUSTRALIA
32.0°S, 116.2°E NOVEMBER 1959

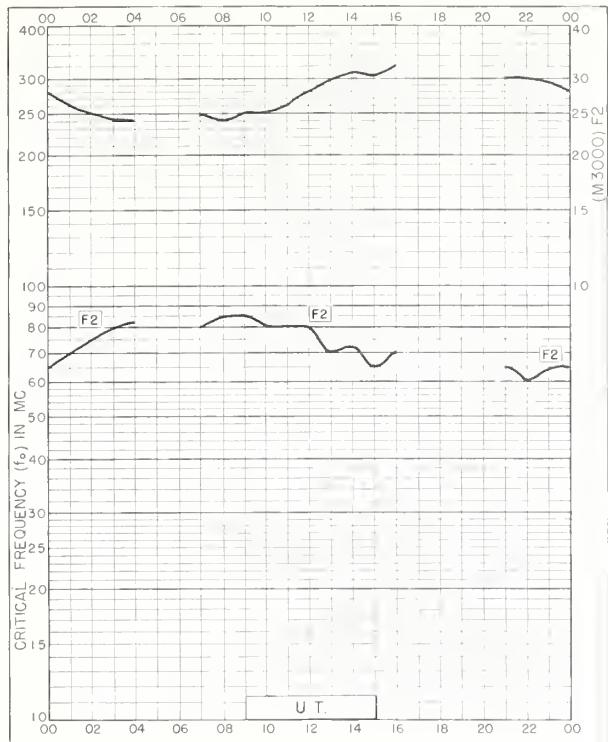


Fig. 37. MAWSON
67.6°S, 62.9°E NOVEMBER 1959

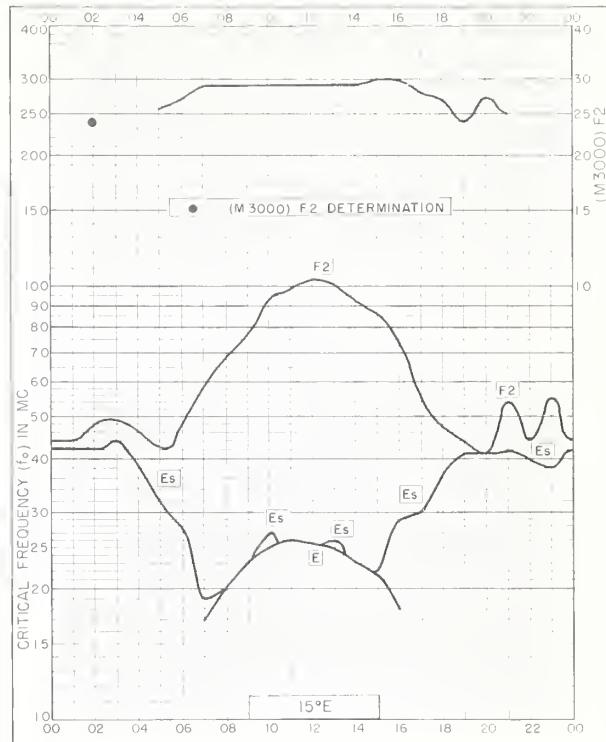


Fig. 38. TROMSO, NORWAY
 69.7°N, 19.0°E OCTOBER 1959

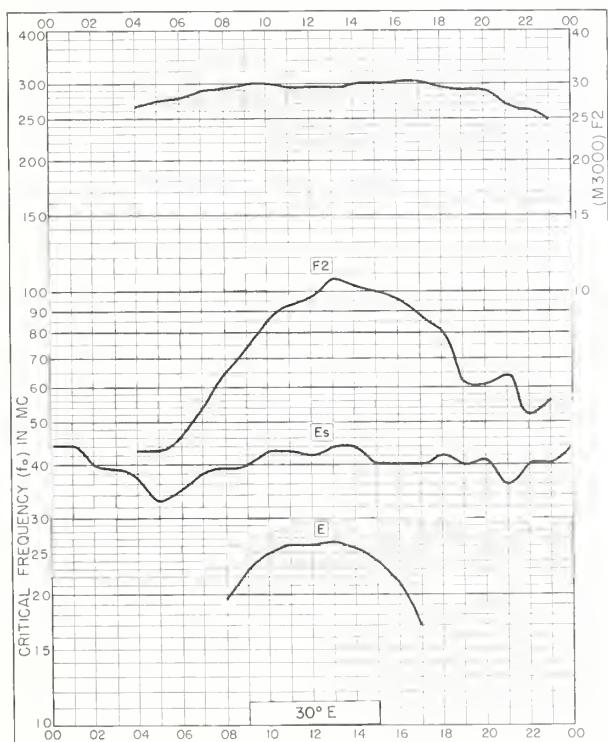


Fig. 39. SODANKYLA, FINLAND
67.4°N, 26.6°E OCTOBER 1959

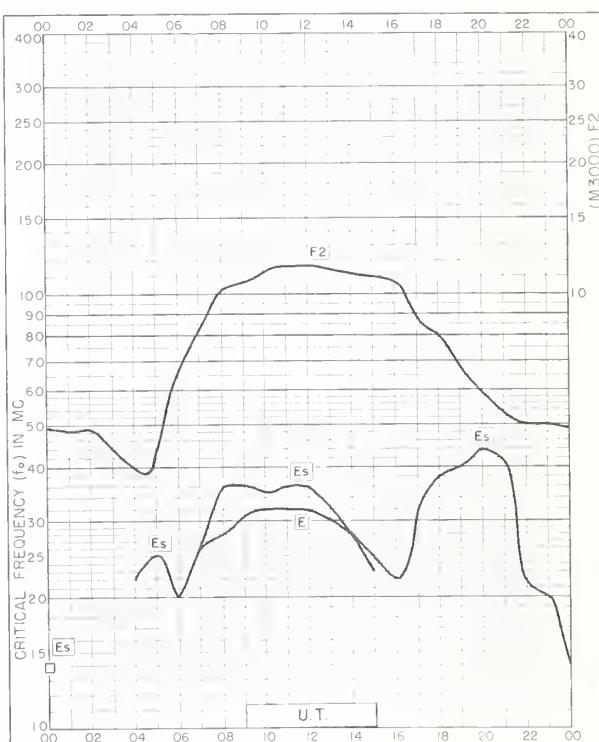


Fig. 40. PRUHONICE, CZECHOSLOVAKIA
 50° 0' N 14° 6' E OCTOBER 1959

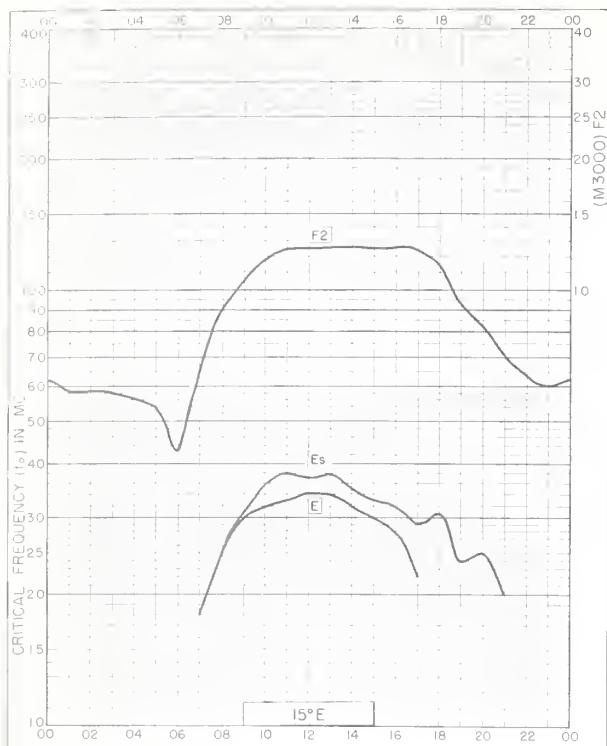


Fig. 41. GENOA (MONTE CAPELLINO), ITALY
44.6°N, 9.0°E OCTOBER 1959

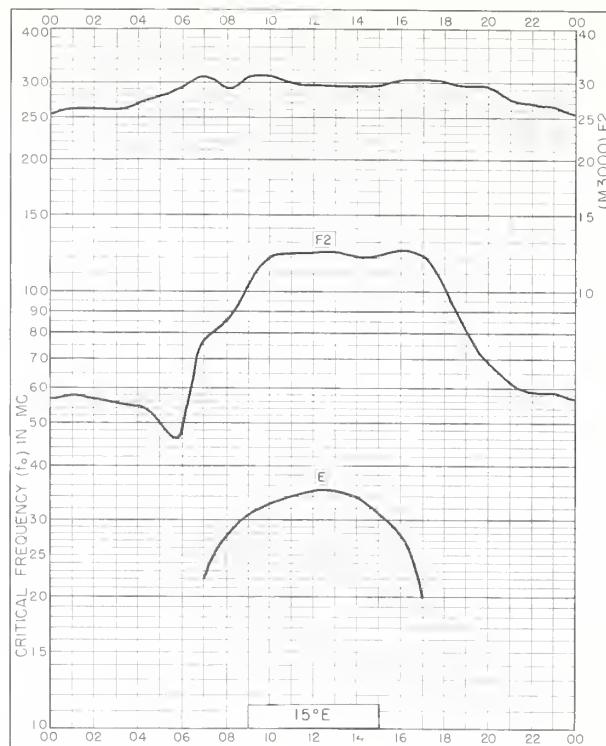


Fig. 42. ROME , ITALY
41.8°N, 12.5°E OCTOBER 1959

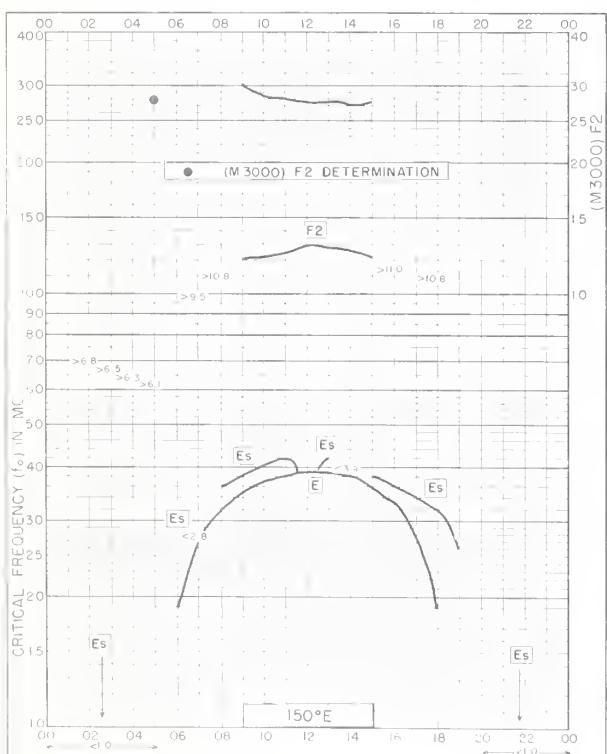


Fig. 43. TOWNSVILLE , AUSTRALIA
19.3°S, 146.7°E OCTOBER 1959

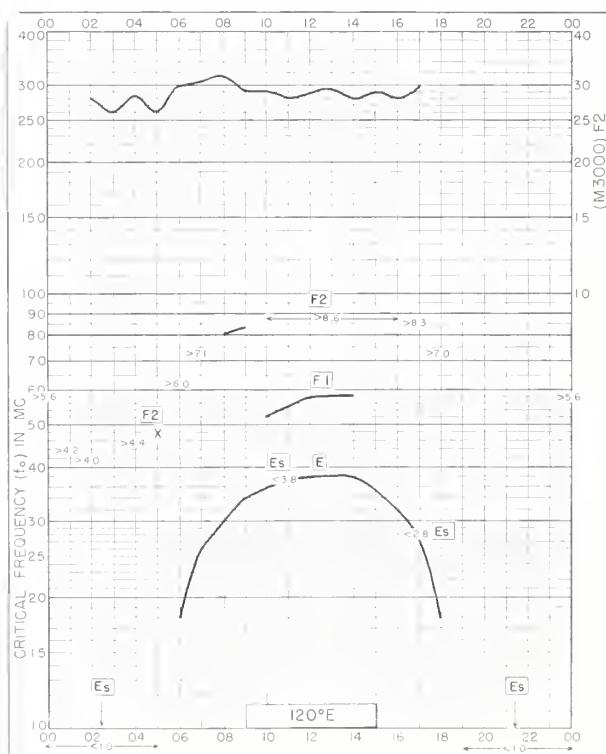


Fig. 44. MUNDARING, W. AUSTRALIA
32.0°S, 116.2°E OCTOBER 1959

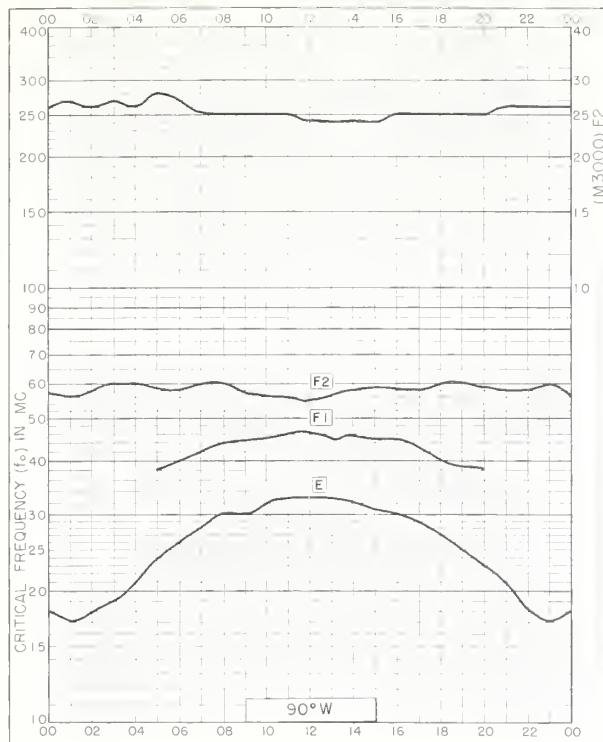


Fig. 45. RESOLUTE BAY, CANADA
74.7°N, 94.9°W AUGUST 1959

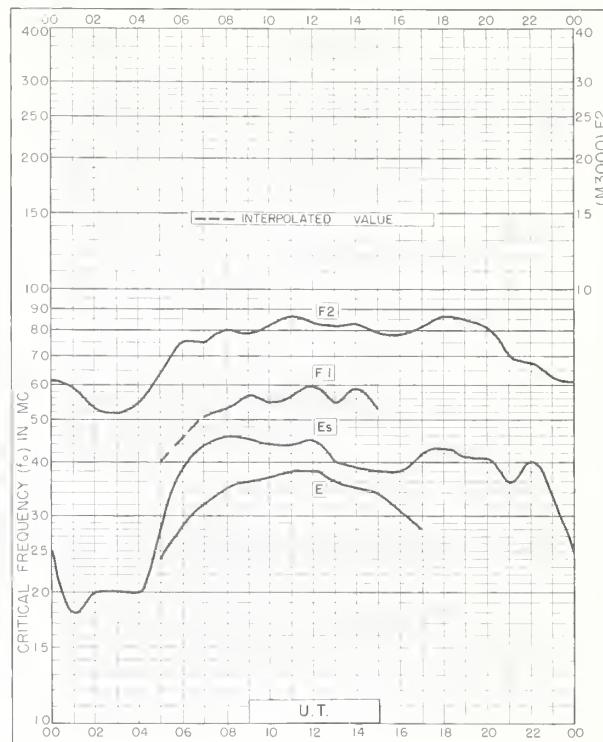


Fig. 46. PRUHONICE, CZECHOSLOVAKIA
50.0°N, 14.6°E AUGUST 1959

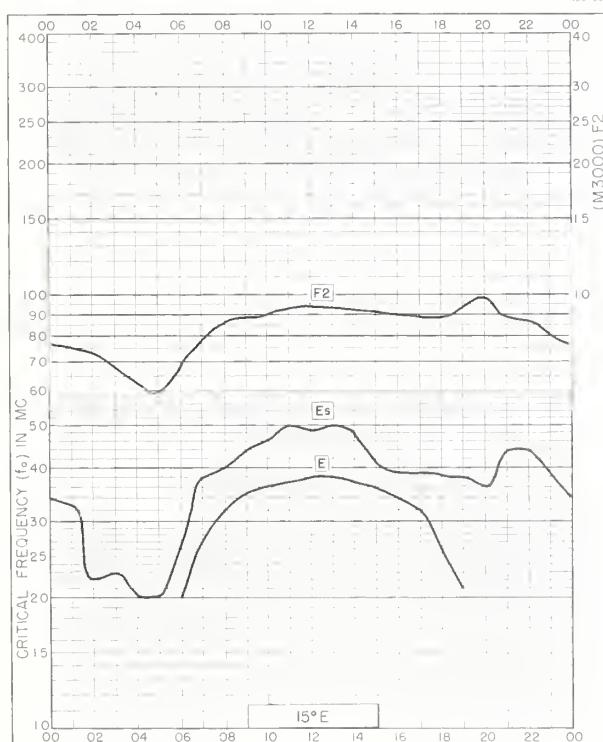


Fig. 47. GENOA (MONTE CAPELLINO), ITALY
44.6°N, 9.0°E AUGUST 1959

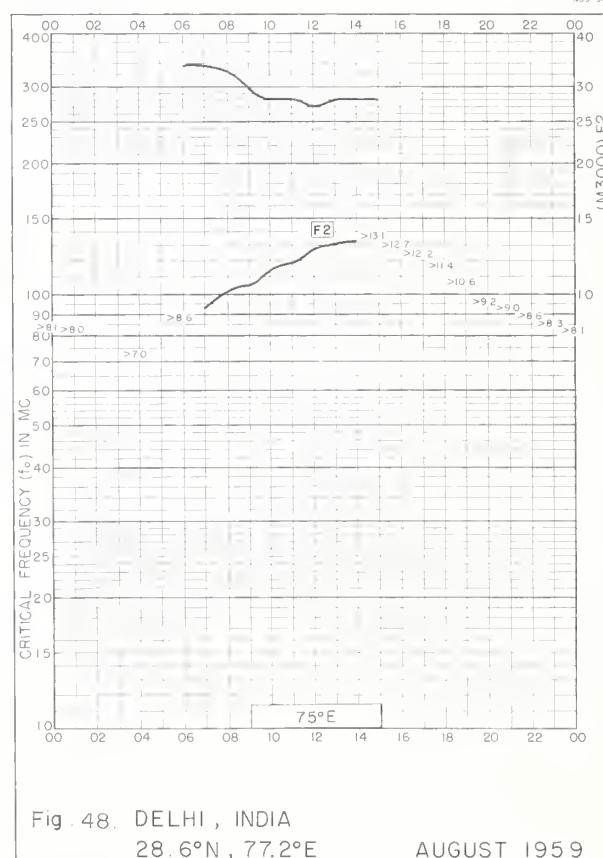
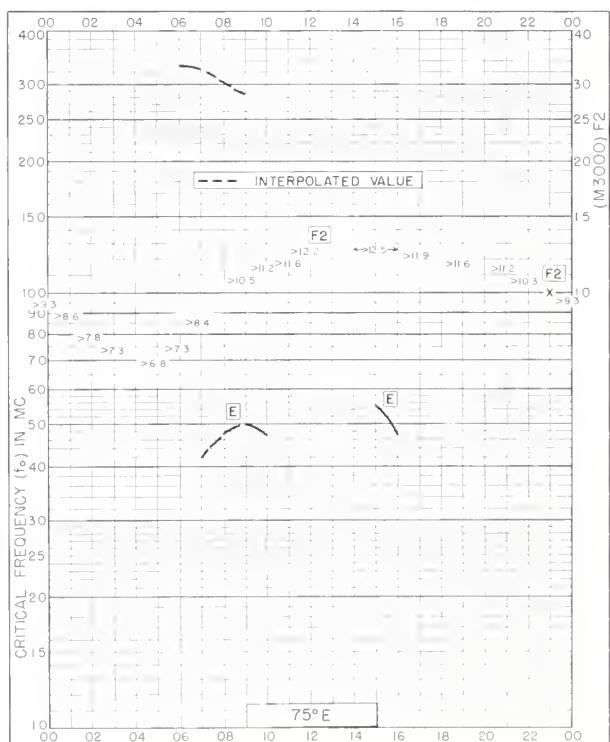
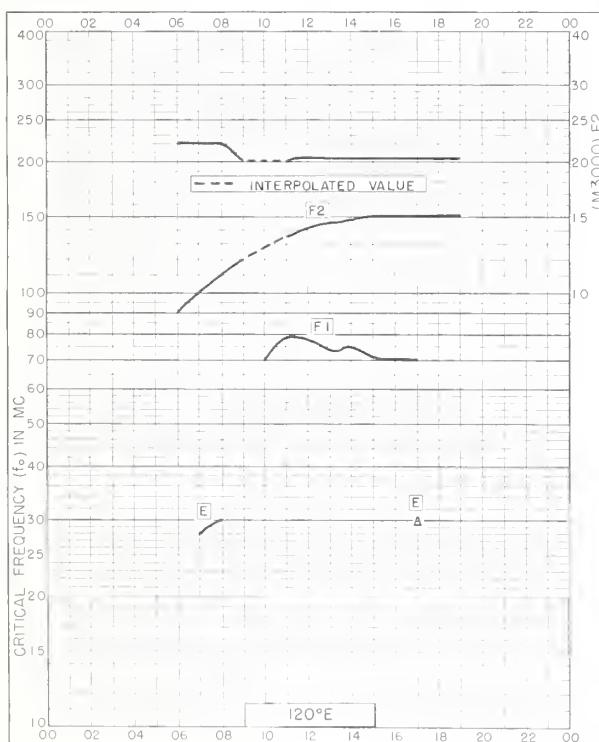
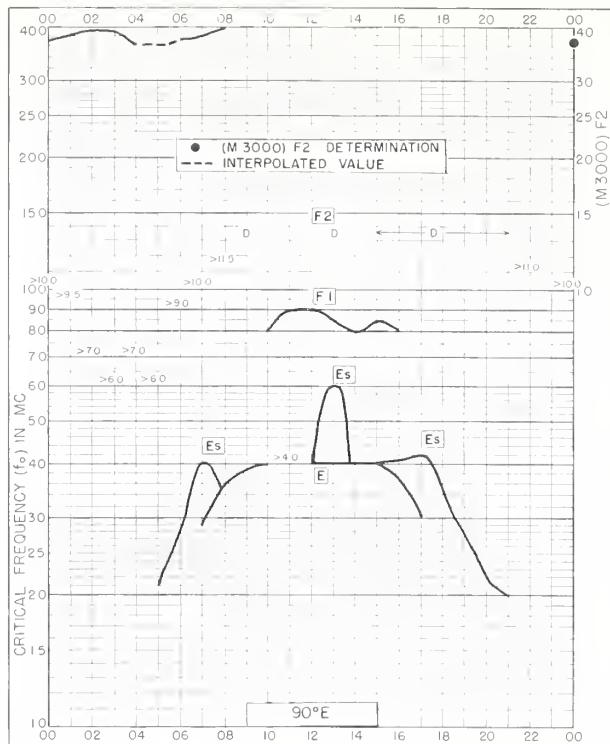
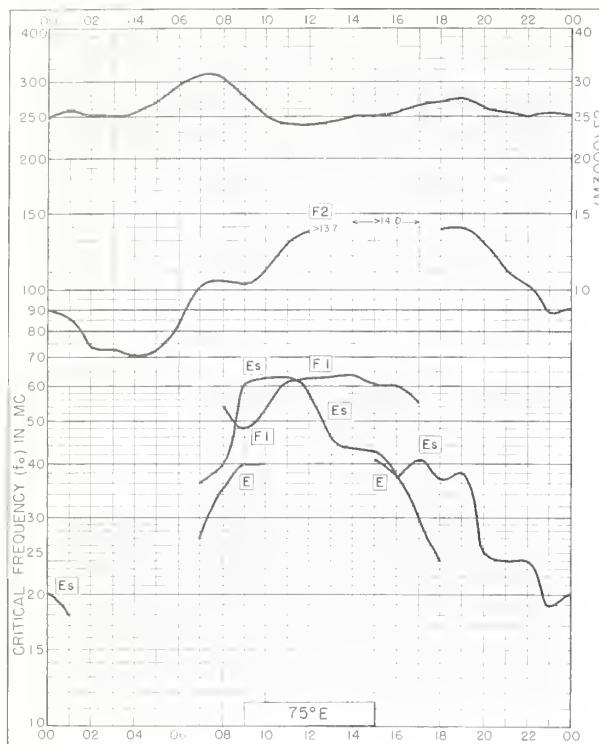


Fig. 48. DELHI, INDIA
28.6°N, 77.2°E AUGUST 1959



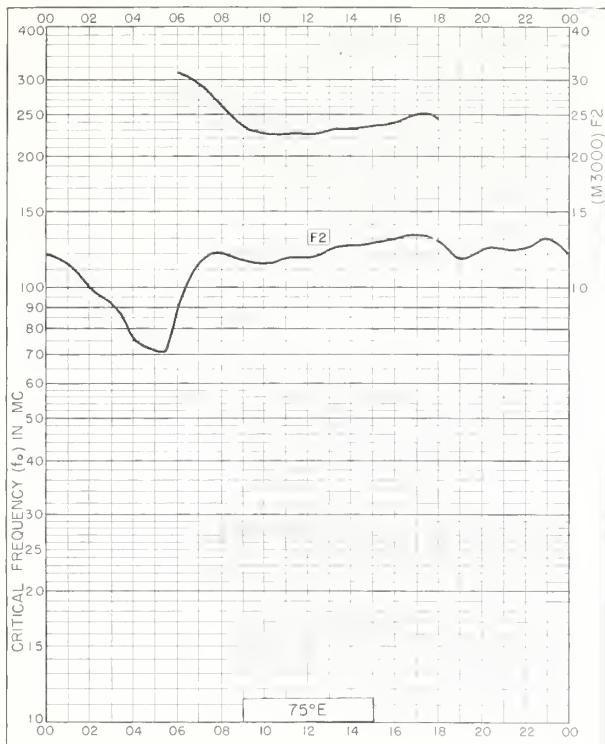


Fig. 53. MADRAS, INDIA
13.1°N, 80.3°E AUGUST 1959

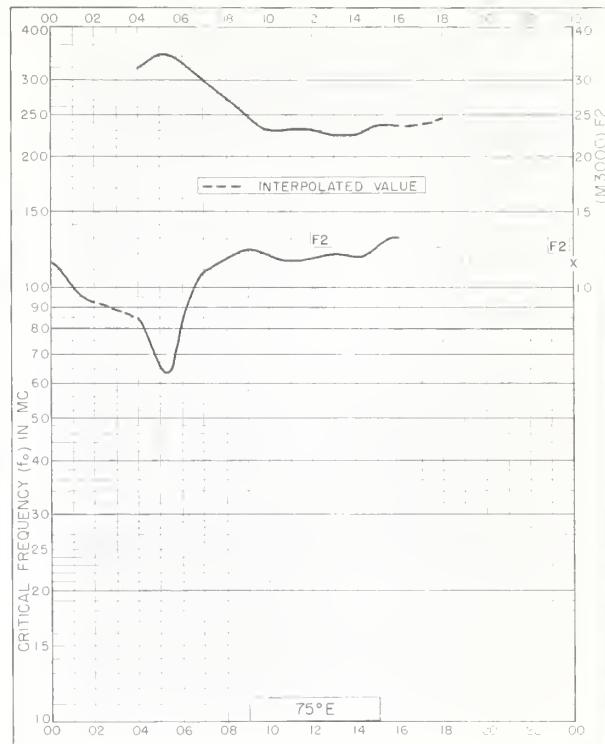


Fig. 54 TIRUCHY, INDIA
10.8°N, 78.7°E AUGUST 1959

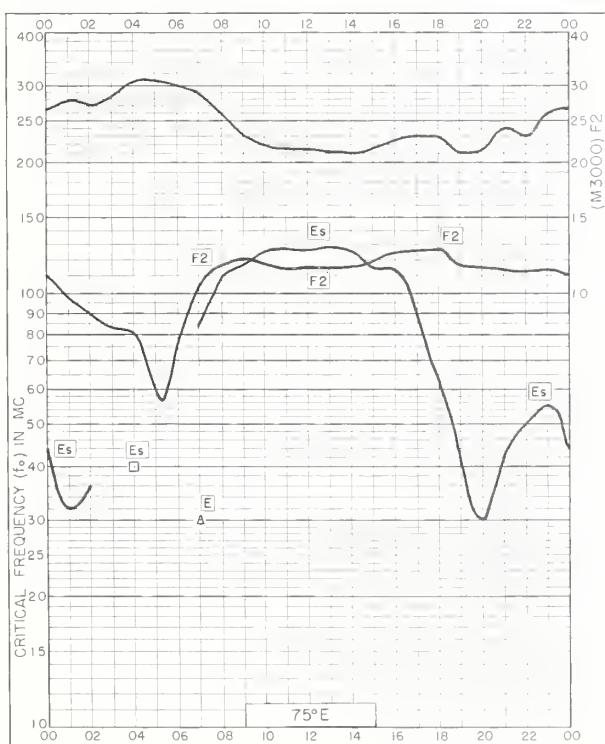


Fig. 55. KODAIKANAL, INDIA
 10.2°N, 77.5°E AUGUST 1959

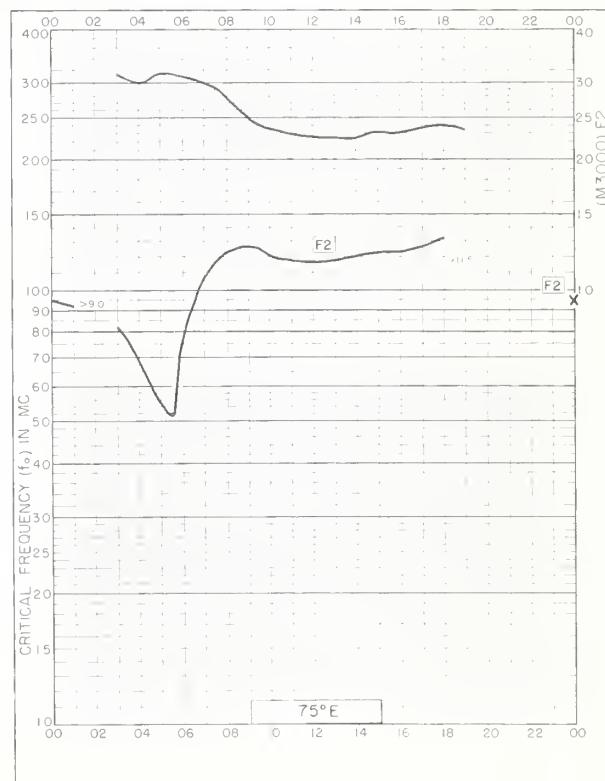


Fig. 56. TRIVANDRUM, INDIA
 8.5°N, 77.0°E AUGUST 1959

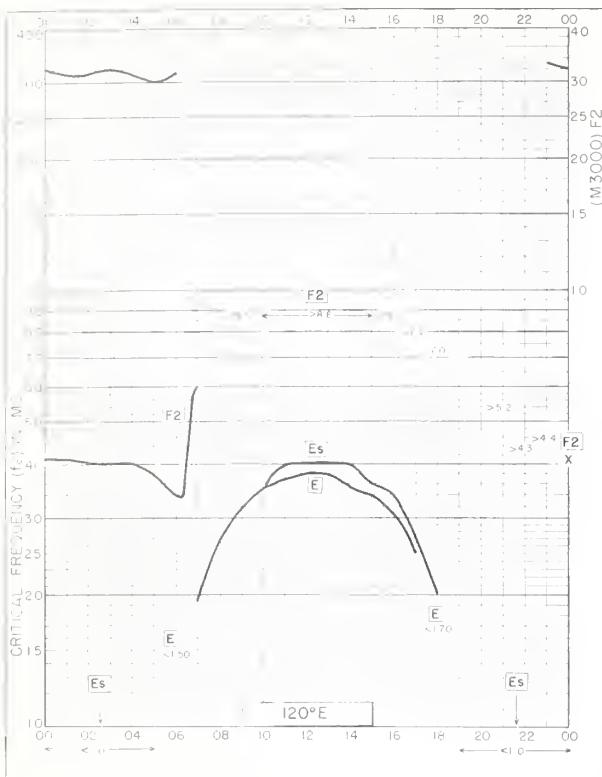


Fig 57. MUNDARING, W AUSTRALIA
32.0°S, 116.2°E AUGUST 1959

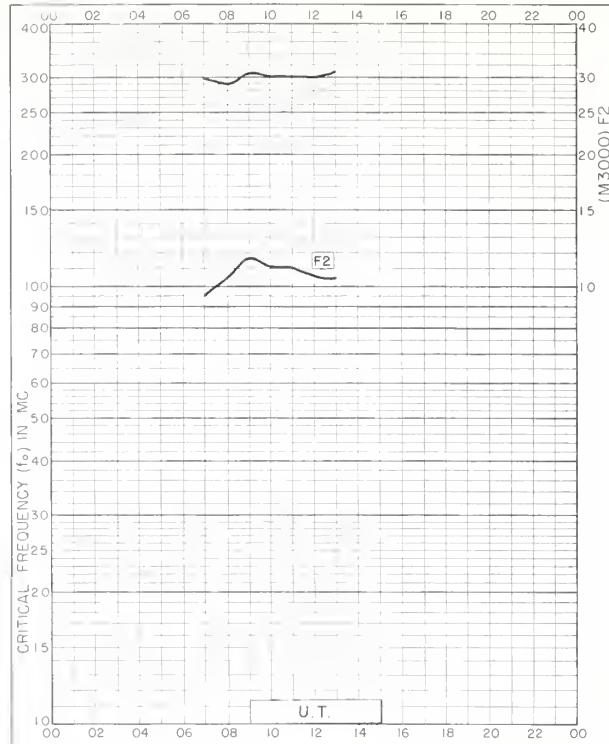


Fig 58. MAWSON
67.6°S, 62.9°E AUGUST 1959

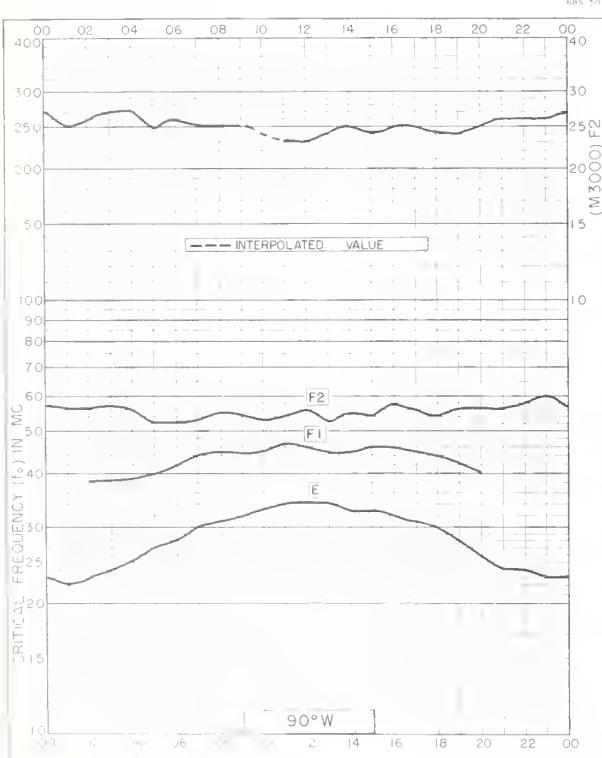


Fig 59. RESOLUTE BAY, CANADA
74.7°N, 94.9°W JULY 1959

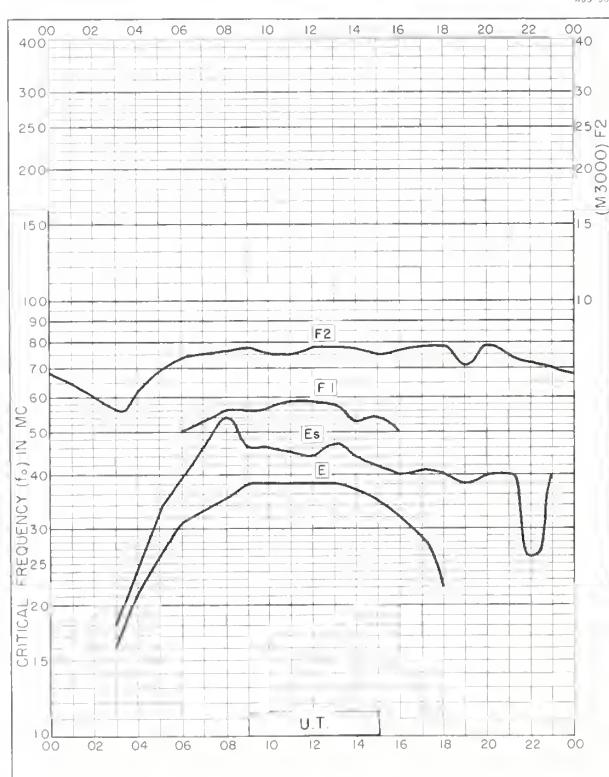


Fig 60. PRUHONICE, CZECHOSLOVAKIA
50.0°N, 14.6°E JULY 1959

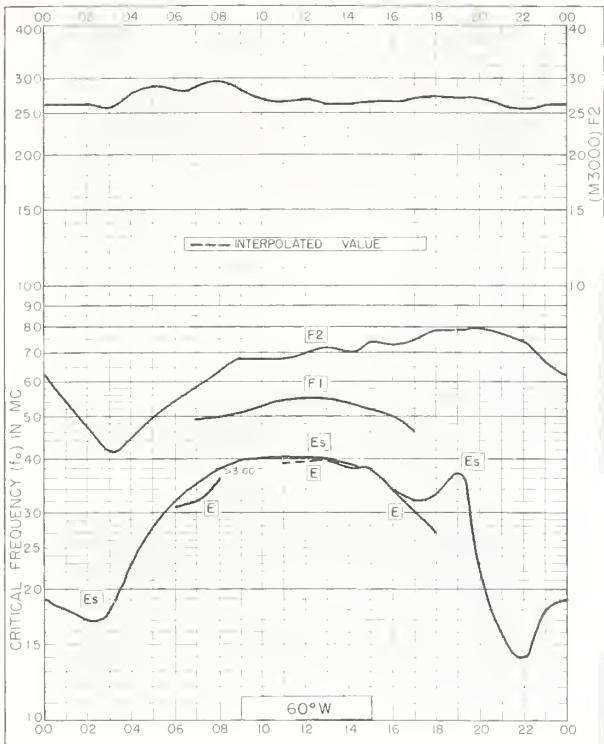


Fig. 61. ST. JOHN'S, NEWFOUNDLAND
47.6°N, 52.7°W JULY 1959

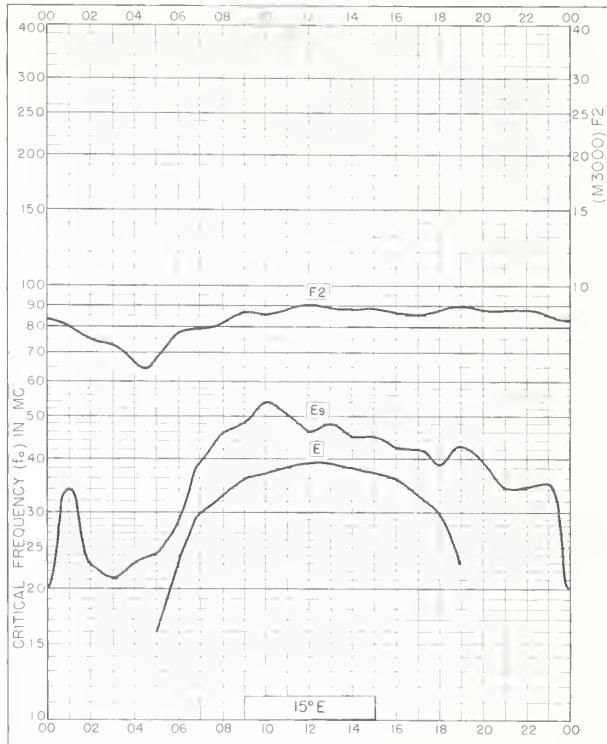


Fig. 62. GENOA (MONTE CAPELLINO), ITALY
44.6°N, 9.0°E JULY 1959

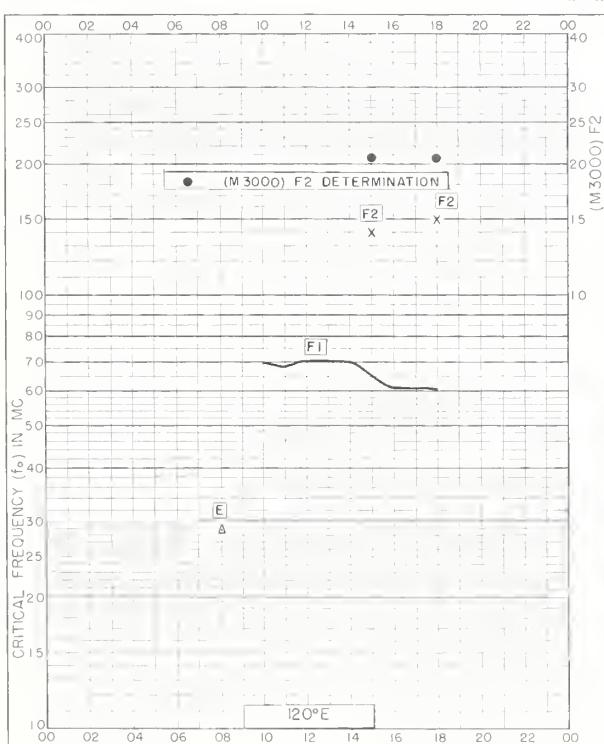


Fig. 63. MACAU
22.2°N, 113.6°E JULY 1959

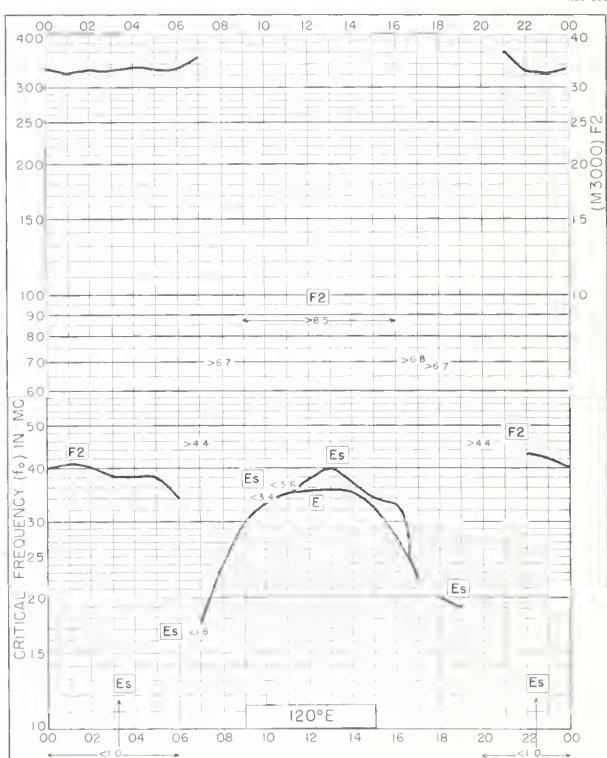


Fig. 64. MUNDARING, W AUSTRALIA
32.0°S, 116.2°E JULY 1959

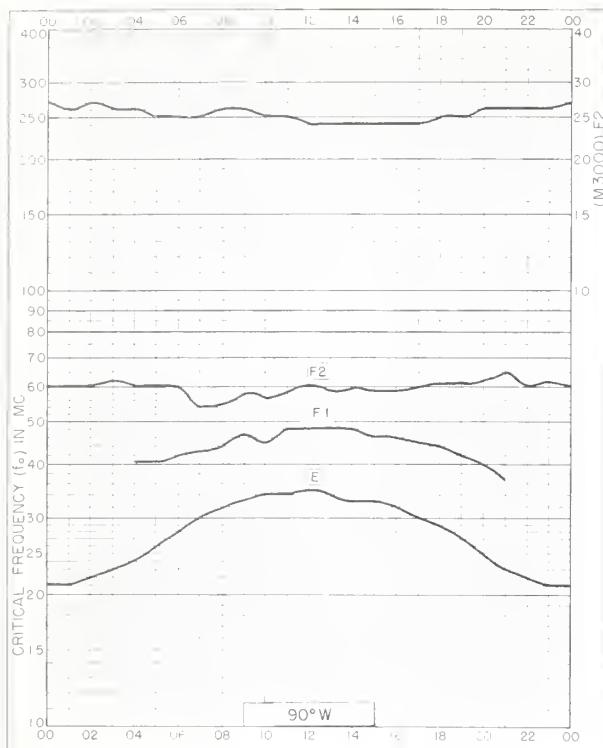


Fig. 65. RESOLUTE BAY, CANADA
74.7°N, 94.9°W MAY 1959

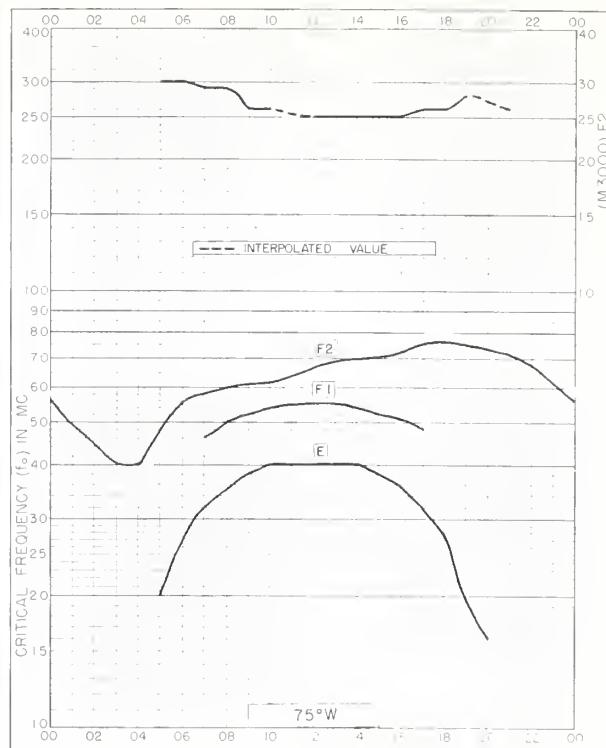


Fig. 66. OTTAWA, CANADA
45.4°N, 75.9°W MAY 1959

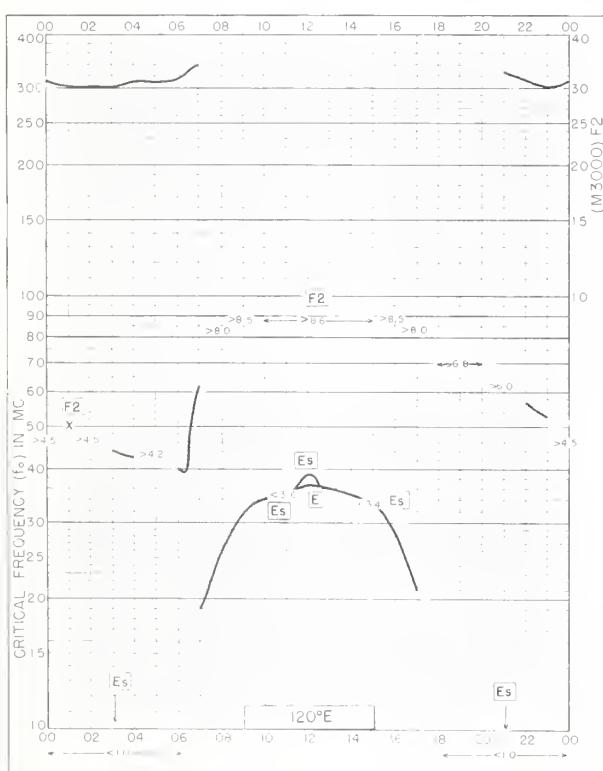


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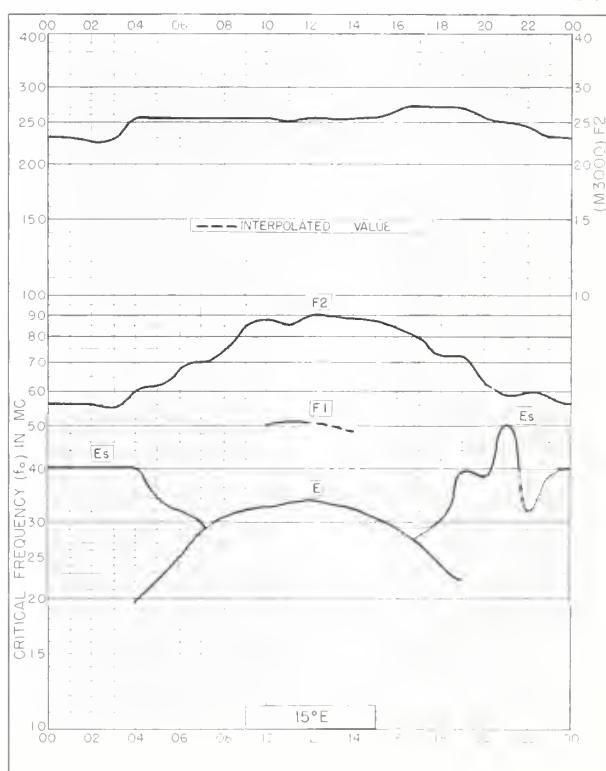


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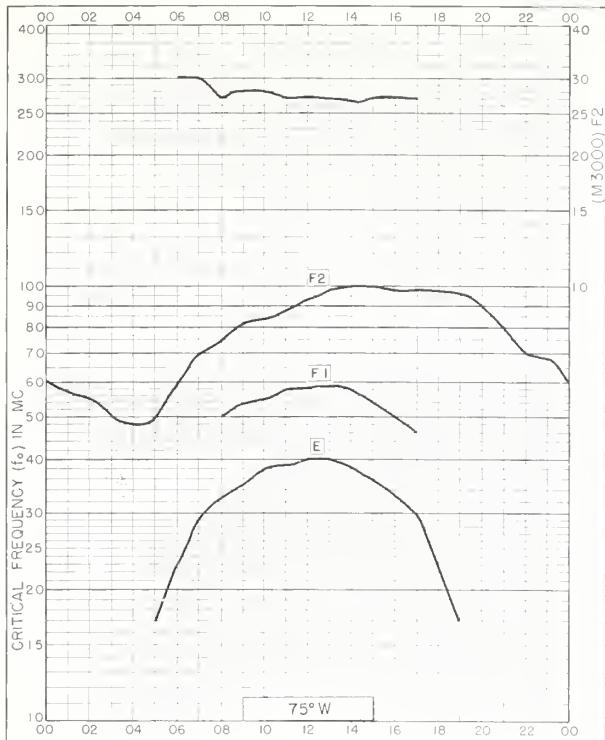


Fig. 69. OTTAWA, CANADA
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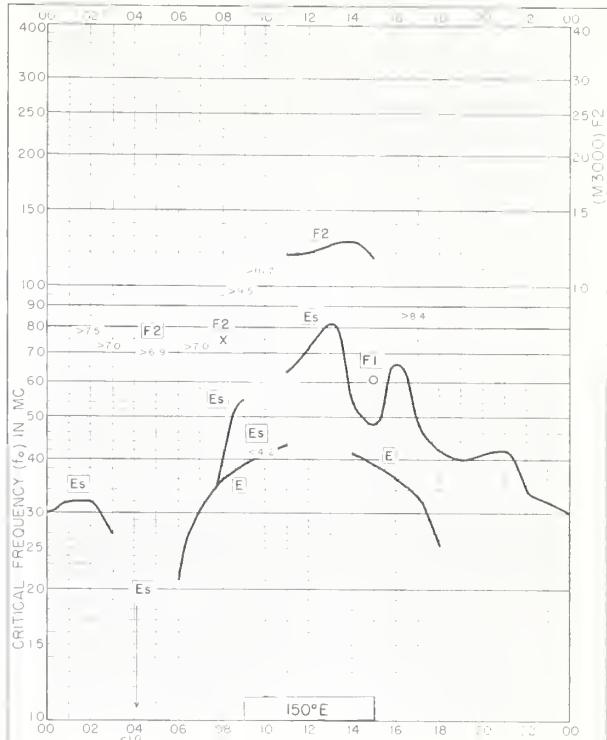


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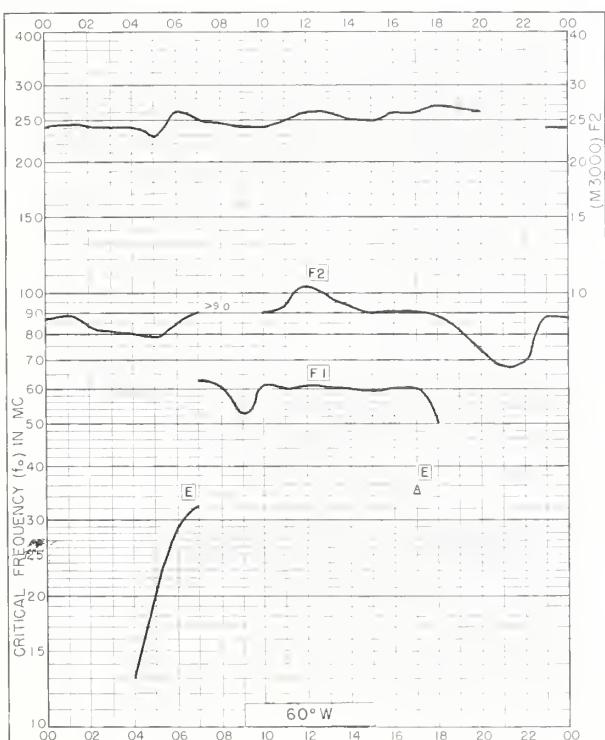


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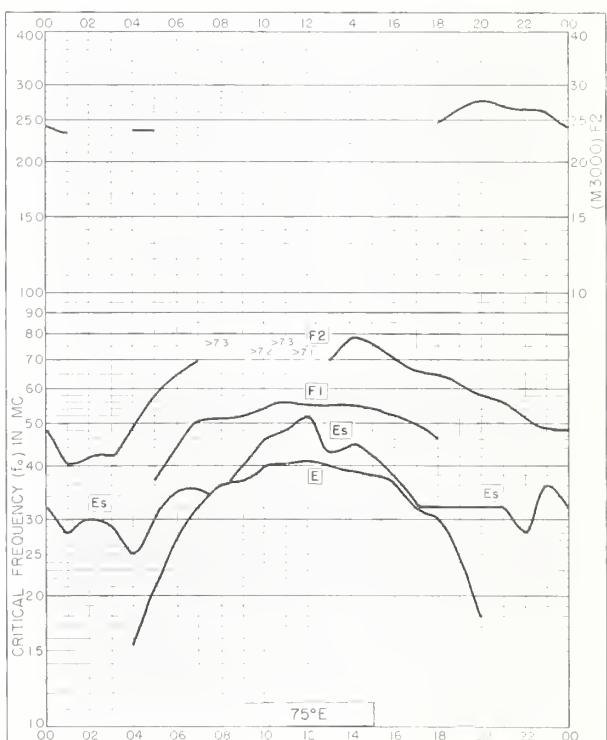


Fig. 72. KERGUELEN I.
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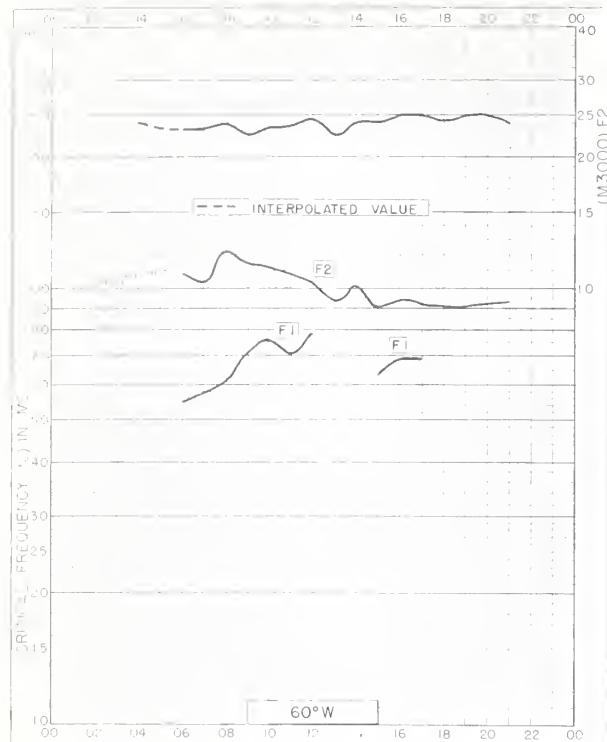


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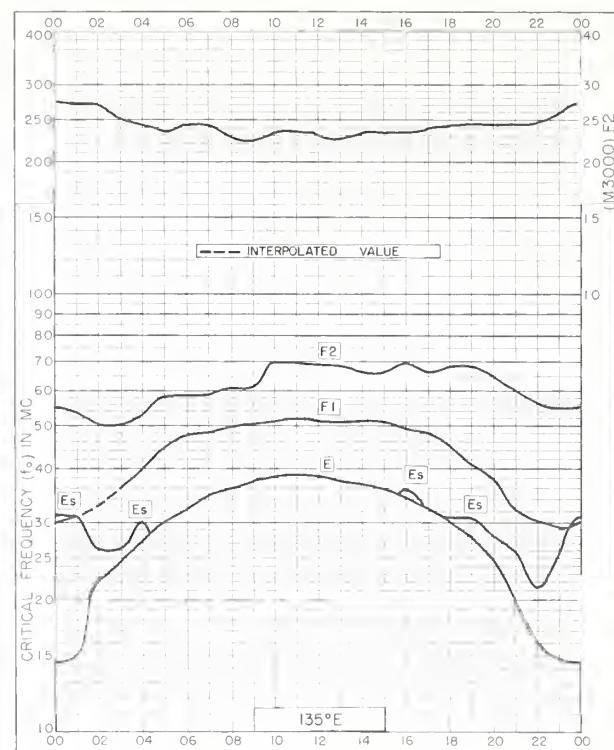


Fig. 74. TERRE ADELIE
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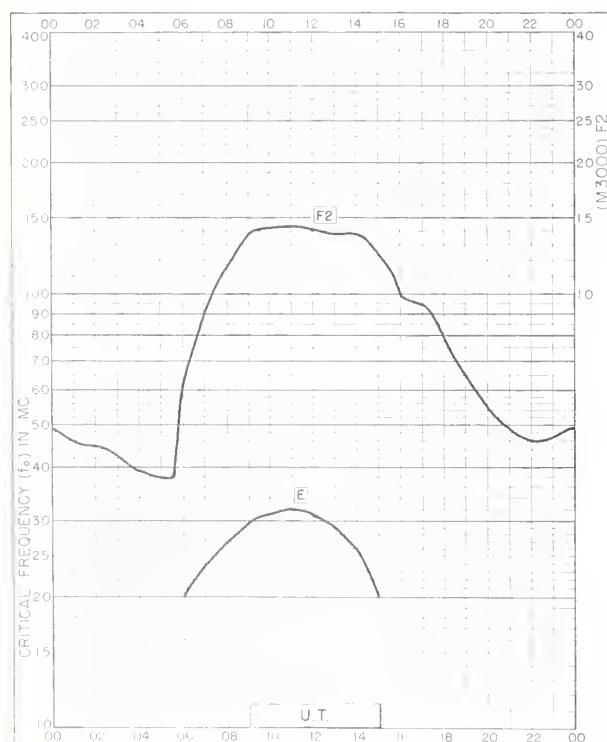


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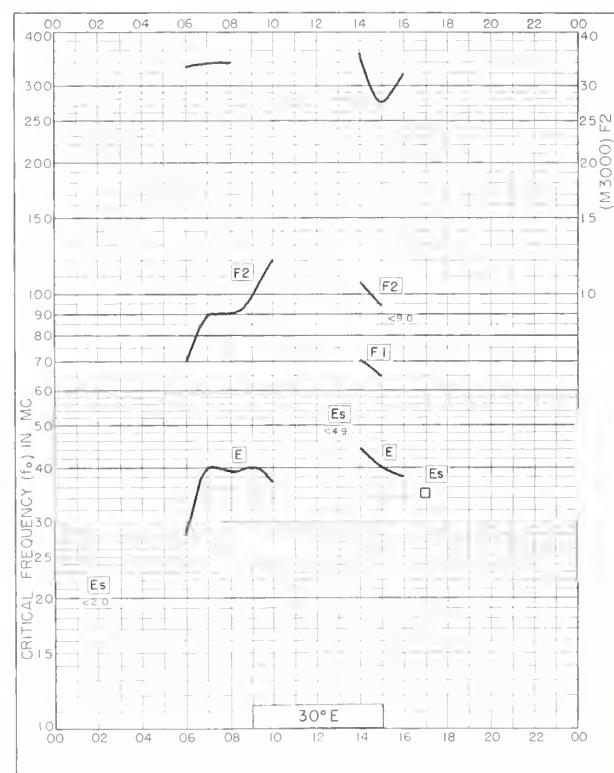


Fig. 76. SALISBURY, SOUTHERN RHODESIA
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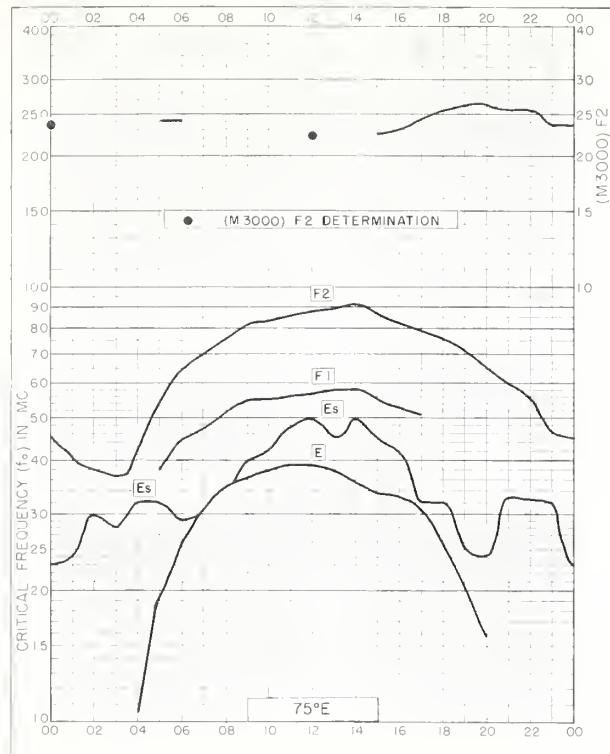


Fig. 77. KERGUELEN I.
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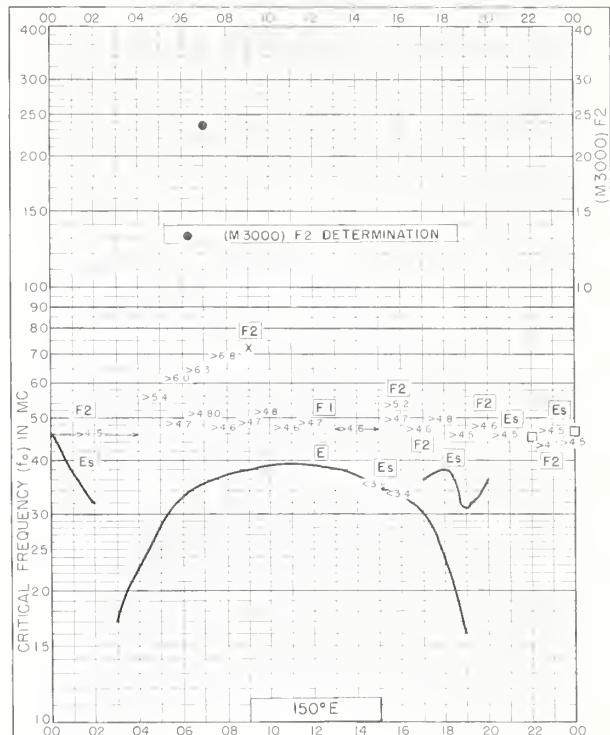


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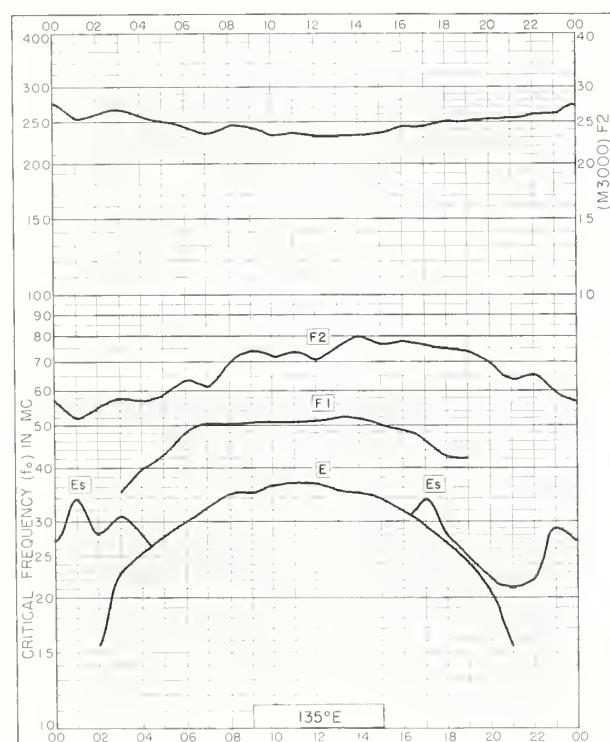


Fig. 79. TERRE ADELIE
66.7°S, 140.0°E NOVEMBER 1958

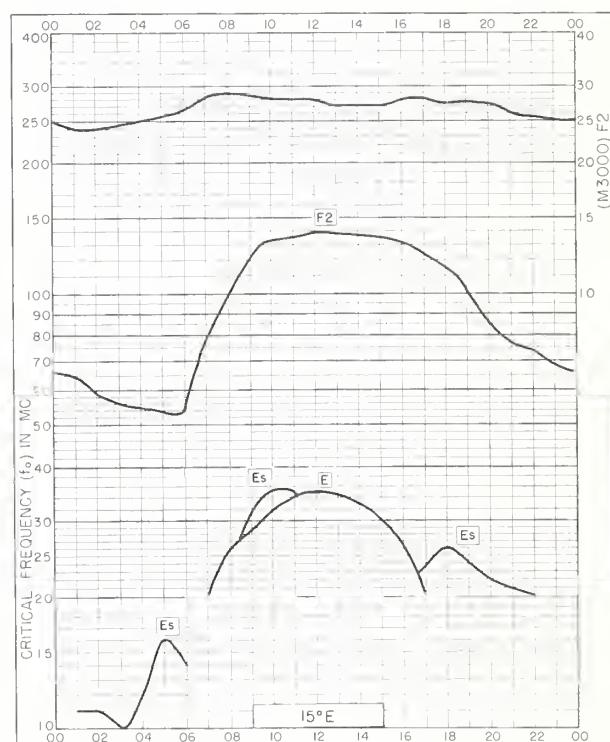
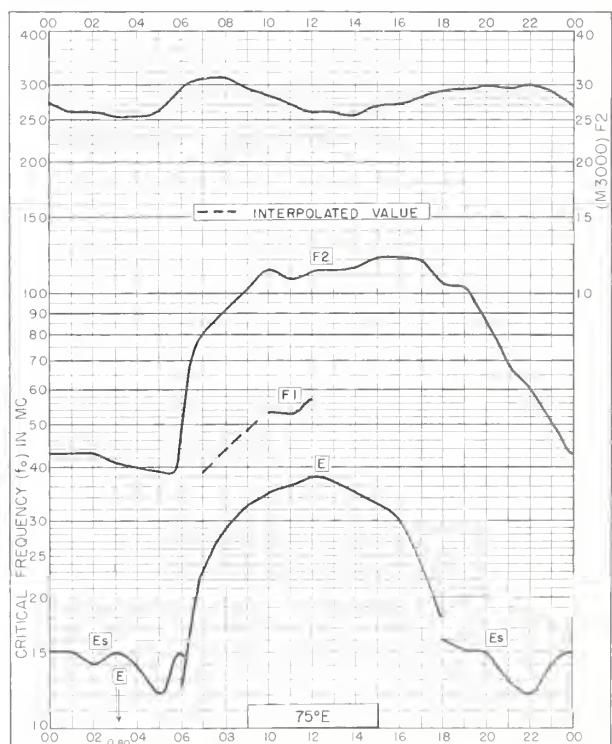
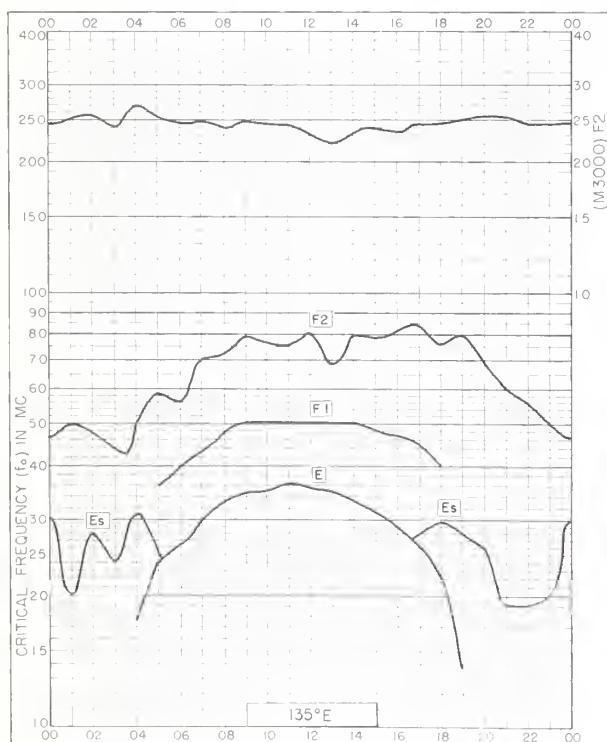
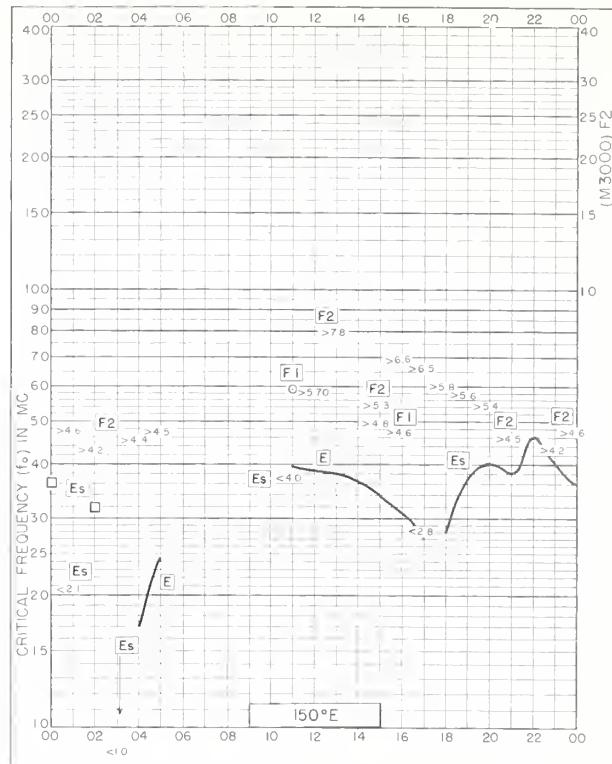
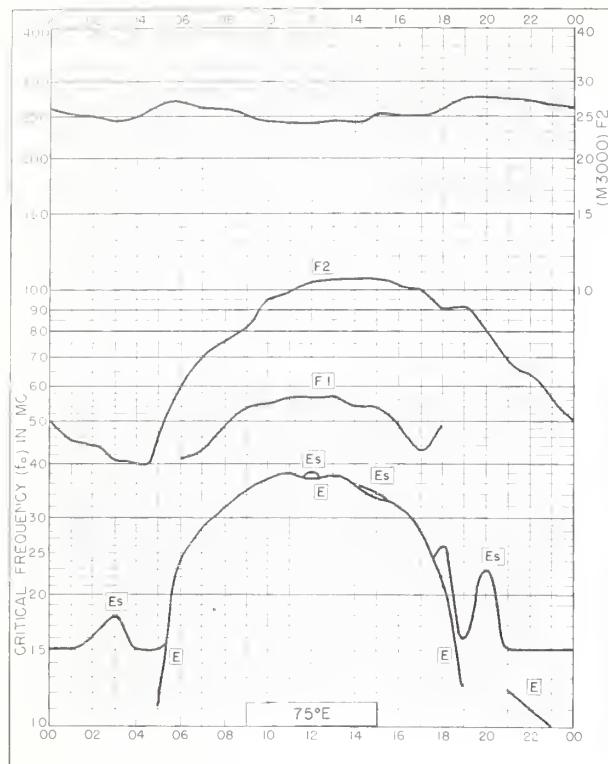


Fig. 80. JULIUSRUH/RUGEN, GERMANY
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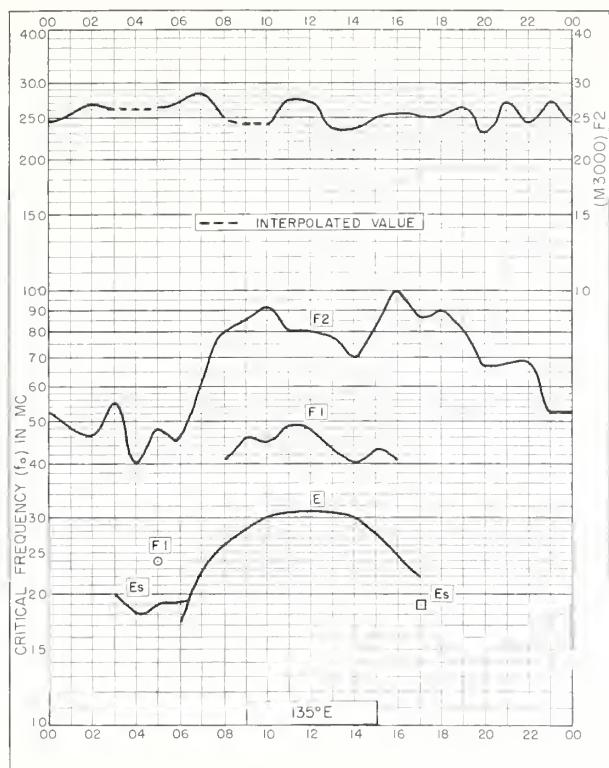


Fig. 85. TERRE ADELIE
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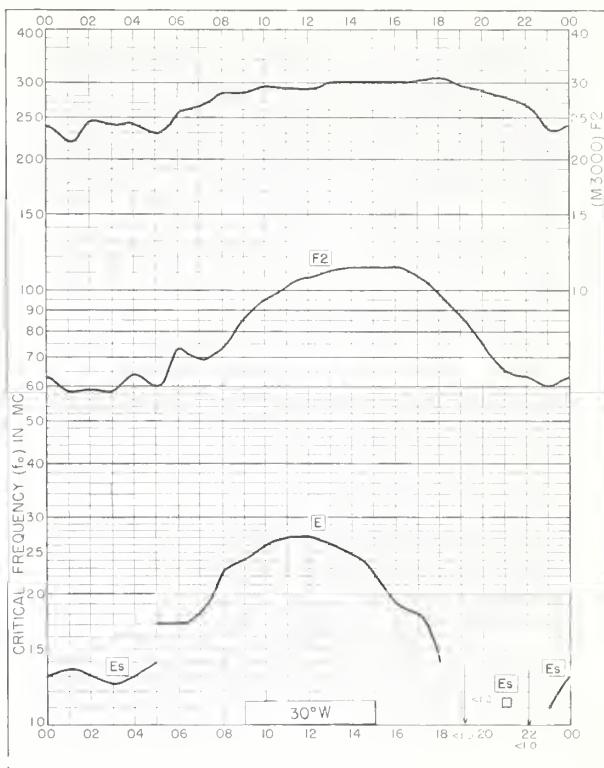


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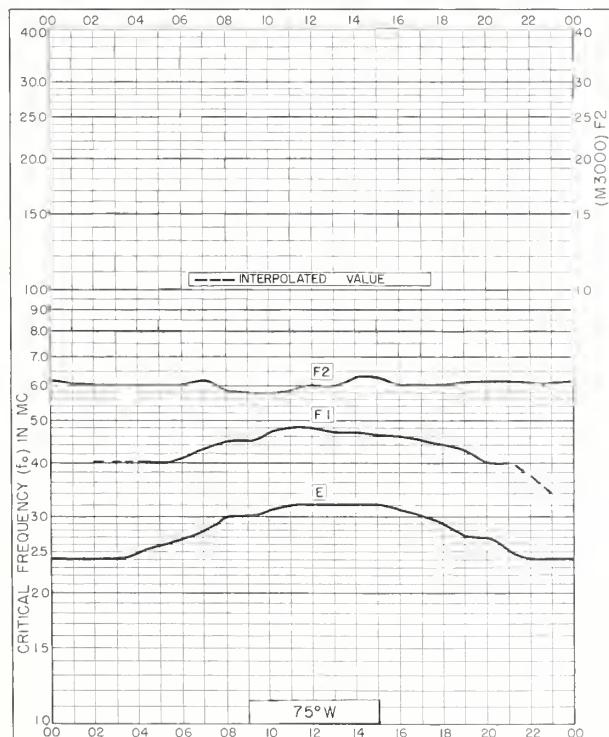


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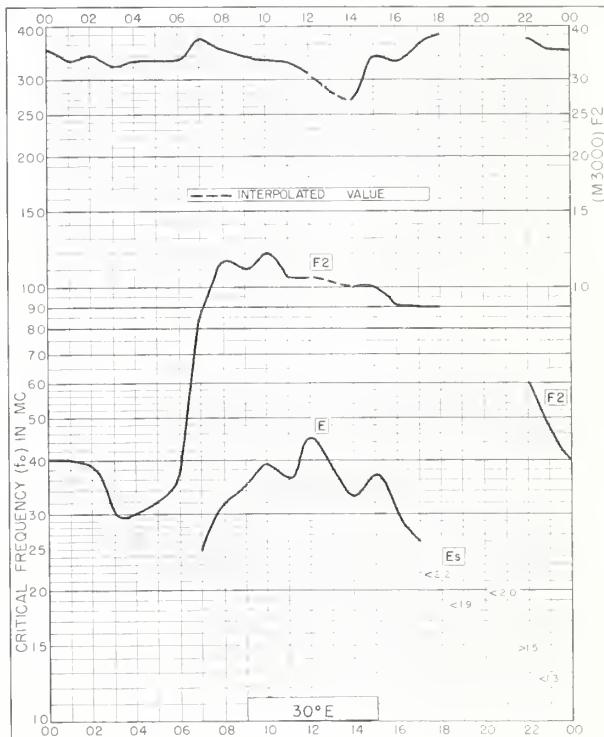


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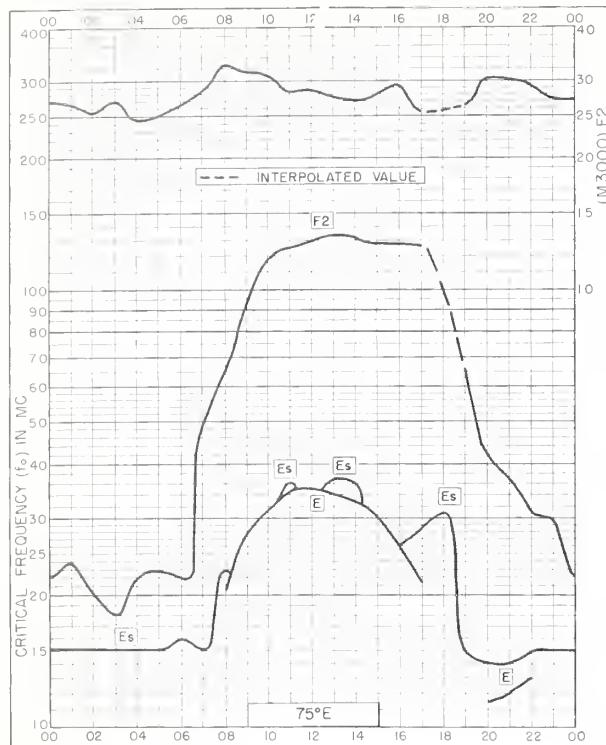


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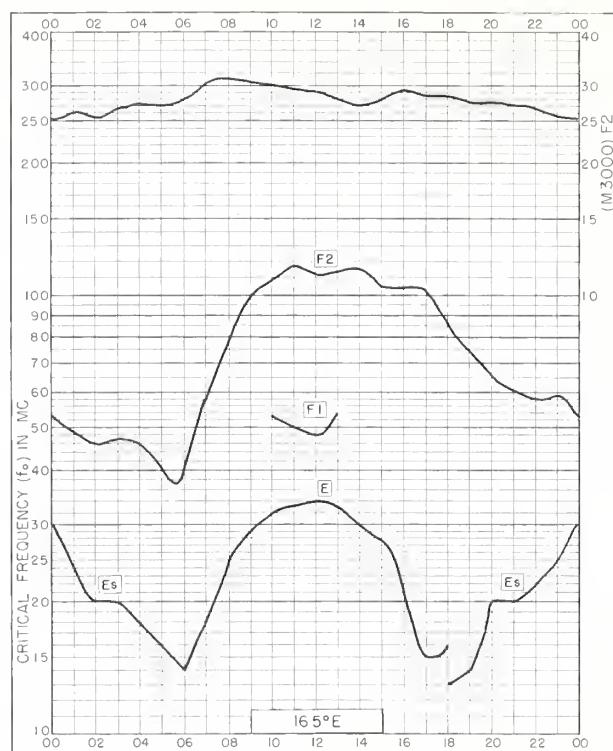


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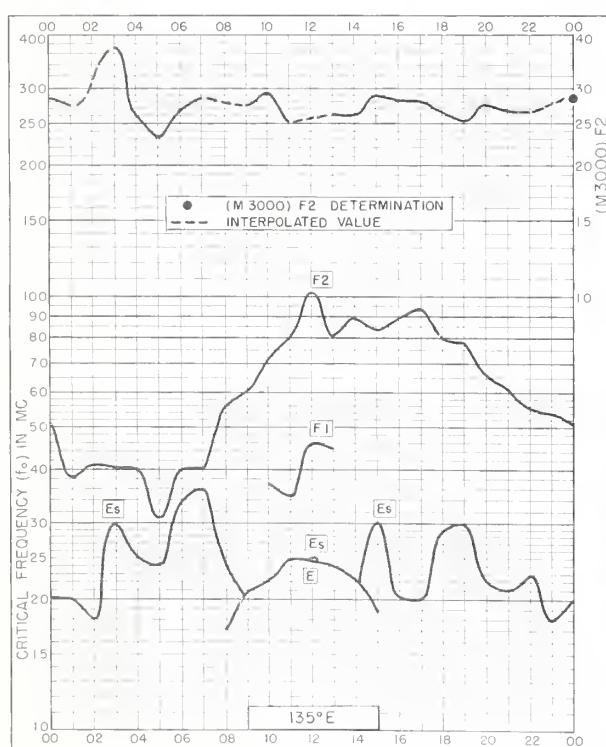


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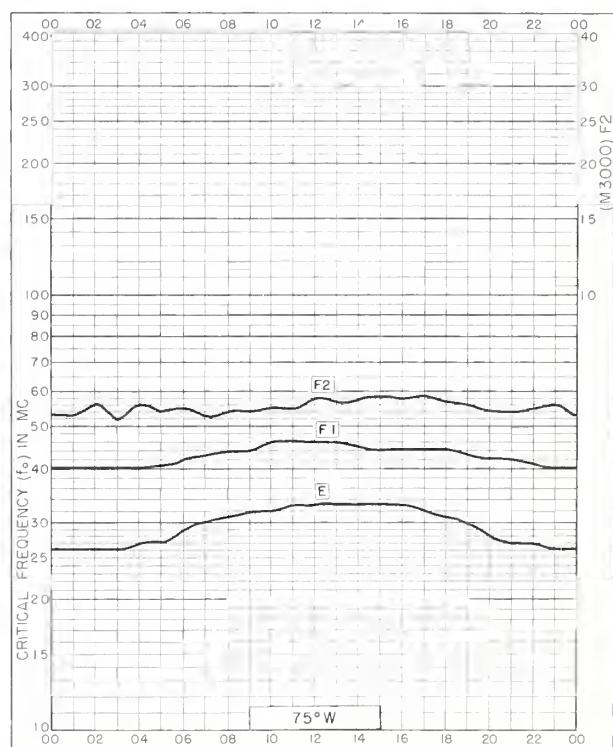


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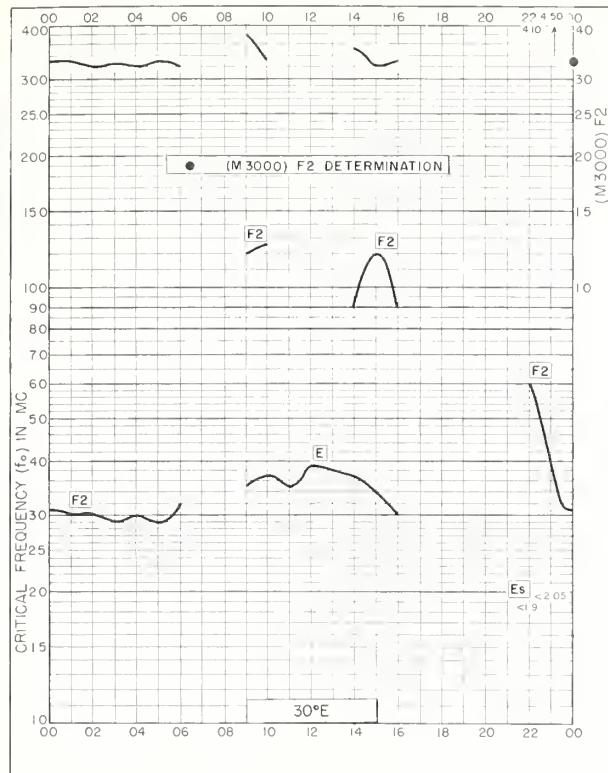


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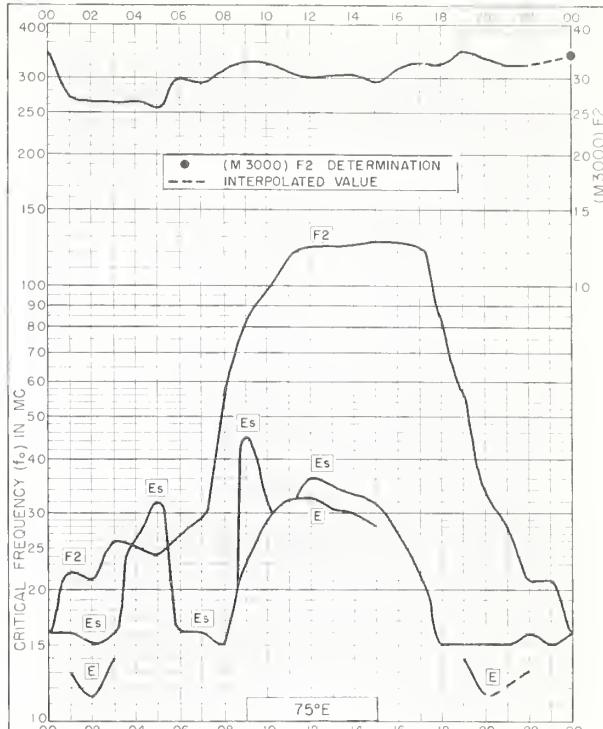


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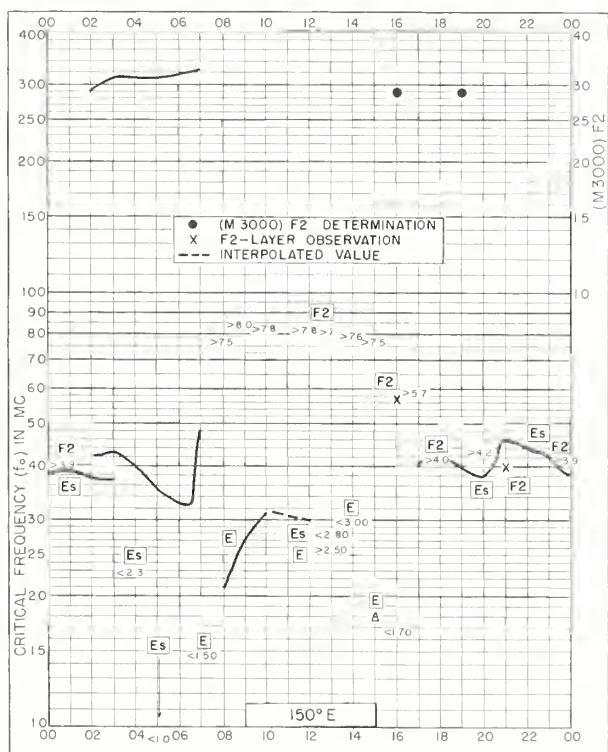


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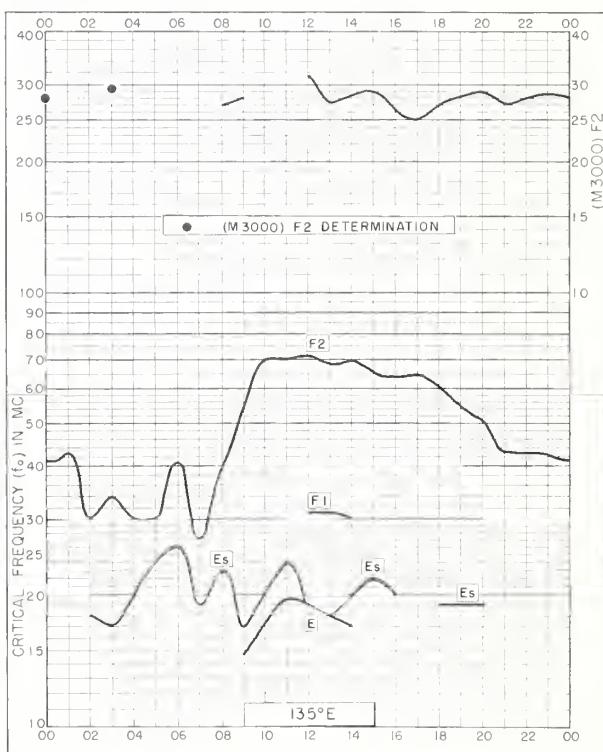


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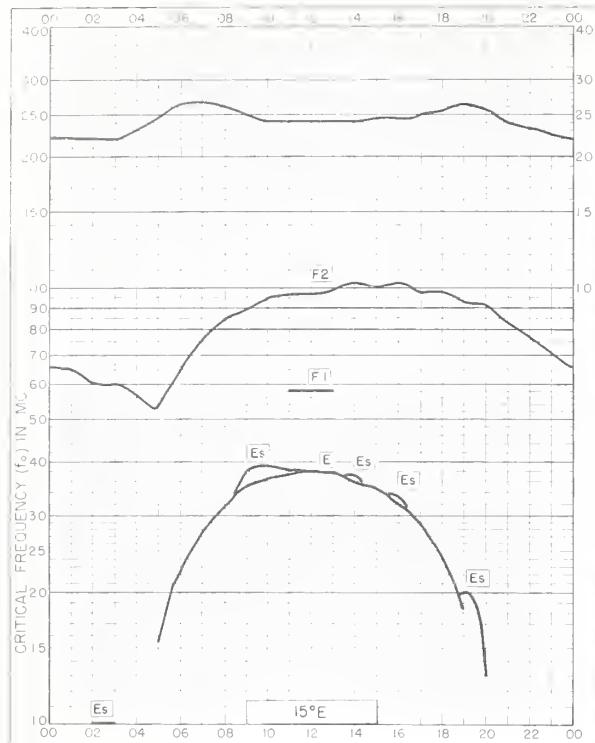


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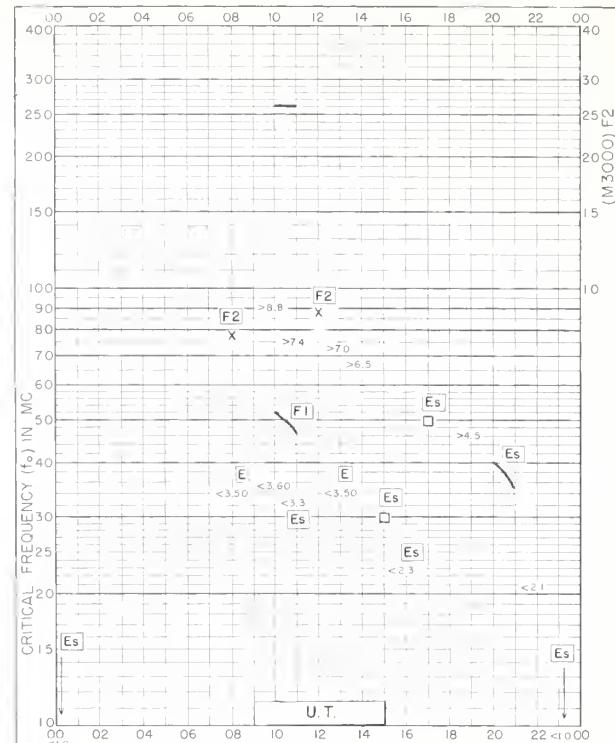


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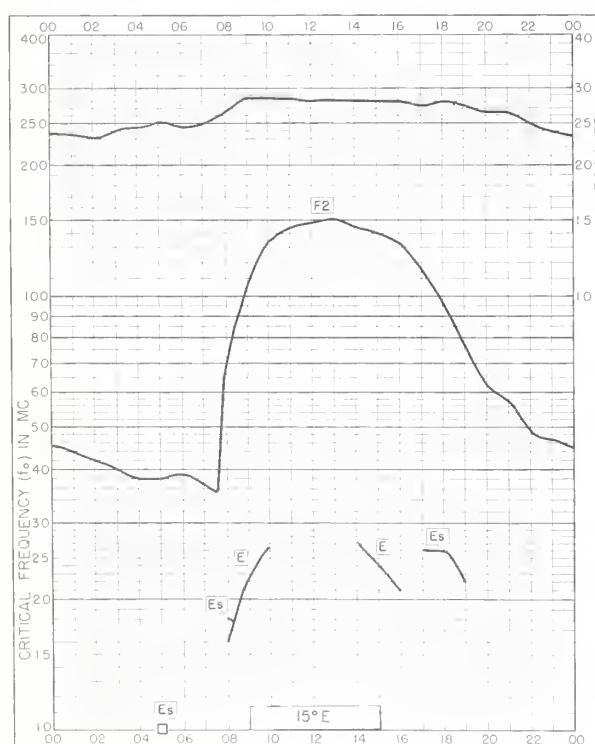


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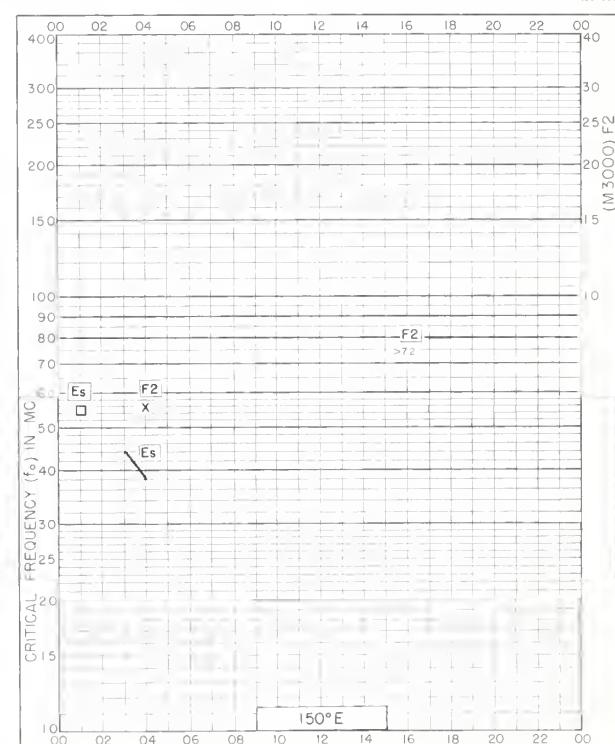


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